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Computing WEEKLY

27 September—3 October 1984

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Vol 3 No 39



THE seventh Personal Computer World Show was held over four days at Olympia last week. Acorn previewed its new business computers, and the new range of Act Apricot computers were on public display for the first time. Full show report inside on page 13.

MSX launch

THE MSX computer system was officially launched last week by the seven Japanese members of the UK MSX Working Group — Canon, Hitachi, JVC, Mitsubishi, Sanyo, Sony and Toshiba.

All of the machines are based on the MSX design standard incorporating the Z80 processor and use a version of Basic developed by Microsoft.

The models and prices are as follows: Canon V-20, 64K, £280.00, available end October; Hitachi HB-H80, 64K, price as

yet unannounced, available around April 1985; JVC HC-7, 64K, £279.00, available end October (printer and disc drive early 1985); Mitsubishi (two models) ML-F48, 32K, £249.00 and ML-F80, 64K, £299.00, both available in November (discs available in 1985); Sanyo MCP100, 64K £299.95, available mid-October; Sony HB-75B (Hi-Bit), 64K plus additional 16K Rom for simple data handling (the UK version, unlike its Japanese counterpart, has a

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Sinclair profits let-down

SINCLAIR Research's profits rose only by a disappointing £253,000 to £14.28m in the year ending March 1984.

Turn-over rose over the same period from £54.5m to £77.7m, according to Sinclair's Financial Statement for 1984, published last week.

In the report, Sir Clive Sinclair accounts for the relatively small increase in profit against turnover rise by saying that "the pocket television and the QL computer both added to costs in the year but little to sales".

The 42% increase in turnover is attributed to continuing demand both in the UK and overseas for the ZX Spectrum, its

peripherals and software.

After Timex pulled out of the US market, due to the price war in the States, Sinclair, whose technology was used by Timex also lost a possible £9m plus in turn-over, judging from 1983 figures.

However, the QL is due to be launched in the US before the end of 1984 on mail order, and Sinclair expects it to sell strongly.

Sinclair is apparently relying on high QL sales to increase profits prior to the company's planned flotation next year. Expenditure on raw materials and consumables rose sharply from £33.7m to £54.9m, implying a much heavier research commitment, and stocks of hardware now stand at £7.2m as against £3.8m. The company's net profit fell from 28% of turn-over in 1983 to 16% in 1984.

● *Bandersnatch*, one of the two unfinished Imagine 'mega-

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The 1984 Microcomputer Chess Championships have been won by a new program developed by Psion for the QL.

Psion Chess will be available next month, priced at £19.95.



ACORN'S ABC PREVIEWED

INSIDE } PCW SHOW } AMSTRAD PAGE } PSION ORGANISER }

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See us at the PCW Show Stand 329

So another Personal Computer World Show has come and gone and this year it left me feeling rather flat.

It seemed that the event is now very nicely predictable.

Even taking into account the new Apricots and Acorns, everything remains in its proper place and under control.

A far cry from the same event only a few years ago which could only have been described as a shambles. Yet it was definitely more exciting then.

It was interesting, therefore, that the seven MSX companies decided against exhibiting at the show because they wanted to distance themselves from the 'hobbyist' industry. The show isn't like that anymore — the dedicated 'hobbyist' is fast becoming an endangered species — rather like the unfortunate tiger cubs on the Microvite stand.

Something important is being lost. Not that a hand-built colour board for the ZX81 should be regarded as the ultimate achievement.

Rather, it is that things have possibly now swung too far in praise of commercialism.

The business is now ruled by The Big Licensing Agreement — Danger Mouse, The Magic Roundabout, Eddie Kidd, Ghostbusters, Daley Thompson.

The actual quality of the program itself is now almost irrelevant with the magnitude of the deal being of paramount importance. And that is to be regretted.

Somewhere in the transition from hobby to big business — in the chaotic surge of the industry — the priorities have got a little mixed up.

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ABC

58,052 copies sold every week
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How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles, and any accompanying programs, should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted. **Accuracy** Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Computer Trade Association Magazine of the Year

Watch out for Wally in a dream of a Program, Pyjamarama.

AUTOMANIA



Join the dots
and complete
the picture of
a right....

WALLY

CRASH MICRO COMMENTS

Keyboard play: very responsive

Use of colour: very good

Graphics: superb, with excellent animation

Sound: great tune (continuous) with well used sound effects—sound may be switched off

Skill levels: 1

Lives: 3

• 'Automania has some of the best animation and realistic graphics that I have ever seen. All the graphics are large and colourful, and needless to say they move smoothly.'

SOLID GOLD

(Home Computing Weekly)

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graphics	100%
value for money	100%



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MSX

Continued from page 1

'professional' quality keyboard), £299, available October (also available in October the Sony HBD-80 360K capacity 3 1/2 inch disc drive); Toshiba, HX-10, 64K, £279.95, available end September (also a printer/plotter, £240.95, and a dot-matrix printer, £349.95, both available in October).

Commenting on the MSX system, Chris McLaughlin for the MSX companies commented, "We may either love MSX or hate it as a standard but it's a final solution in the problem of compatibility — achieved by consensus within the majority."

"Nobody is standing up and saying that the Z80 is knife-edge state of the art stuff. It's not necessarily the best — but it's workable — and we can build applications such as home banking and home shopping around it."

"The pricing side was never discussed by the MSX companies together but originally they were hoping to produce them at around £250 — but the way the yen has been going against the pound has meant the cost has had to go up."

Over fifty UK software houses are now committed to supporting MSX. They include Alligata, Andromeda, Artic, Bug-Byte, DK'Tronics, Hewson, Hi-soft, Llamasoft, Mastertron, Micromega, Ocean, PSS, Quicksilva, Terminal and Virgin.

None of the MSX companies exhibited at last week's Personal Computer World Show. An MSX spokesman explained that MSX is intended as the world's first family computer standard and the seven electronics giants wished to remain apart from the 'hobbyist' end of the industry.

● Casio, Brother and Sharp all now have gained MSX licences and Casio has released an MSX computer in Japan.

Sinclair

Continued from page 1

games may eventually appear under the Sinclair label.

It is thought that Sinclair is in negotiations to buy Bander-snatch from Imagine's receivers, although neither Chris Chambers, the receiver, nor Sinclair were prepared to comment on the possibility.

New year machines

ATARI US has announced that it will release new 16 and 32-bit machines early next year.

The 16-bit machine, Atari Corporation president Sam Tramiel said in an interview in Taiwan, will be launched in January 1985, and be non-IBM compatible. He claimed the machine had already been designed by Atari engineers.

The 32-bit micro will be a development from that computer, and be introduced next

April.

Sam Tramiel—son of Atari chairman Jack Tramiel—said it would cost less than \$1,000 (around £800-£850). If true, the machine could start another computer price-cutting war in the US. IBM's and Apple's nearest competitors both cost over \$2,000.

Atari has set a production target for 1985 for these machines of between three and five million at sites in Ireland and the Far East.

Ghosting for Activision

GHOSTBUSTERS, the hit US movie, will be available in the UK as a computer game before the film is released here.

Activision has acquired rights from Columbia Pictures

December," said Activision's UK managing director, Geoff Heath. "It features both characters and music from the film, and will be a mix of arcade and strategy action."

Ghostbusters (the game) has been designed by David



to develop software based on the film, the theme music of which is currently riding high in the British top ten.

"Our game version will be on sale by mid-November while the movie goes on release in

Crane, who also designed *Pitfall*, *Pitfall II* and *Decathlon*. It will be simultaneously released for the Atari VCS, Commodore 64 (£10.99), Spectrum (£9.99) and MSX (£11.99) machines.

Top team for Beyond

BEYOND Software has signed up a top programming team to develop a graphic adventure for Beyond.

The team of six programmers—calling itself Denton Designs—includes Ian Weatherburn and John Gibson, both of whom were previously with Imagine Software working on its *Bandersnatch* 'mega-game'.

"The graphic adventure has a working title of *Shadow Squad*, and will be ready in the New Year," said Terry Pratt of Beyond. "The player controls six screen characters, each with individual weaknesses and strengths, sent to a 'Deathstar'-type place on a diplomatic mission."

The adventure uses English text commands, with different graphics for each screen. The player must co-ordinate all six characters to complete the mission.

The game will be released for both the Spectrum and Commodore, priced between £8 and £10.00.

Stratos-jamais!

ORIC has now said that there is no possibility of its new machine—a successor to the Atmos, based around the 6802 processor—being launched this year.

An Oric spokesman said, "It was originally our plan to launch the micro in France before the end of 1984, but there is now no question of it appearing this year. Oric are, however, currently working on

Disc unit for the CPC 64

AMSTRAD has announced its DDI-1 disc unit and interface for the CPC464 micro.

The drive is based on the 3 1/2 inch Hitachi standard and is a 160K 40-track double-sided double-density disc system.

The disc operating system is either AMSDOS — an extension to locomotive Basic with simple filing commands, or the Digital Research standard CP/M. The system is also file compatible with the single-sided format used by CP/M on the IBM PC.



The CP/M disc is bundled free with the Amstrad disc system. As well as the CP/M disc each drive is bundled with *Dr Logo* on disc, the Digital Research version of *Logo*.

The drive, plus interface, CP/M and *Dr Logo* is priced at £199.98. The system can also support a second disc drive for which an additional interface is not required. The additional disc unit is priced at £159.95.

Sabre Wulf follow up

TWO follow-ups to Ultimate's highly successful *Sabre Wulf* are to be released shortly.

Underwilde and *Knight Lore* both continue the adventures of the Sabreman.

Underwilde is an arcade-style game in which the Sabreman must do battle against the inhabitants of the Underwilde in over one hundred screens. *Knight Lore* is, according to Ultimate, "the first step in a new generation of computer adventure simulation developments".

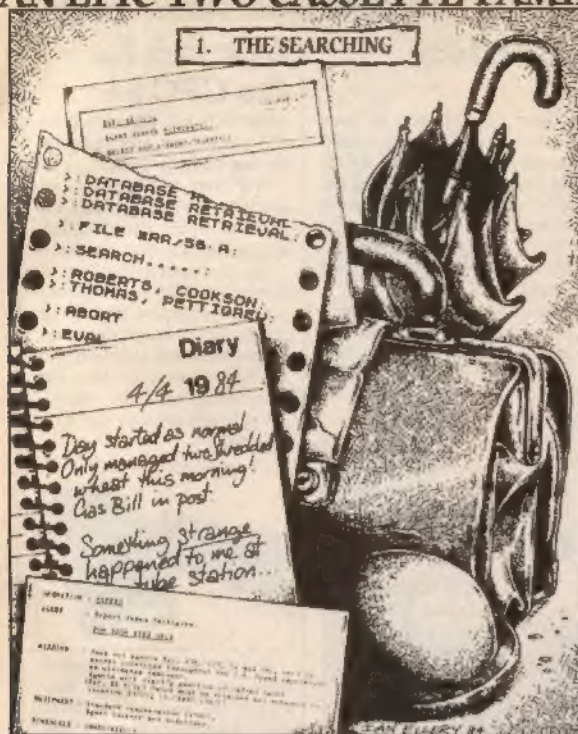
Underwilde and *Knight Lore*, both for the 48K Spectrum, will cost £9.95 each.

a number of new products."

The machine had a working title of 'Stratos'—this will now not be used as another computer company also has a product with that name.

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Letters

Commodore compatibility

Now that production of the Vic 20 seems likely to cease, what will its Vic owners do for software? The C16 has a 16K memory, but are there any plans to make its software compatible with the Vic? If not, will Vic software still be available in the shops?

Jason Watts
13 Winifred Avenue
Hornchurch
Essex

C16 software is not compatible with the Vic20 but Commodore says that it will continue to provide software support for the Vic20.

All change in Superbasic

To alter Alan Turnbull's program *QL Rom* (September 20 issue) for use on the latest Superbasic version JM, change the table address in Lines 190 and 230 to 26724 and 27400, respectively.

Thanks to Alan for this useful little program.

Jonathan Treadgold
11 Bellhouse Walk
Rockwell Park
Bristol
BS11 0UE

From the arcades

I am writing to complain about your review of *Gilligan's Gold* for the Commodore 64. It appears to me that the reviewer has never been into an arcade. If he had, it may have come to his attention that the game is in fact a copy of *Le Bagnard*, a game which has had some success in the arcades.

I would also like to point out that not every game involving moving a player round a screen and climbing ladders is a rip-off of *Manic Miner*. In fact, *Manic Miner* was not the first game of its sort. *Miner 2049er* for the Atari came out long before *Manic Miner* and is very similar to it. *Miner 2049er* may have been the game that spur-

red the programming of *Manic Miner*.

Guy Norton
The Wellyards
Old Road
Weston
Staffs

It is up to the reviewers whether they choose to judge a game entirely on its own merits, or to draw comparisons with other titles.

Better late than punctual?

Both the more recent Sinclair computers were plagued with late arrival dates and broken promises and, consequently, attracted masses of publicity which certainly does not seem to have done any harm to their popularity.

Amstrad, however, arrived on time as a complete package and only seems to have attracted the requisite reviews.

Does this mean that computers have now gravitated to the level of film stars where any publicity is good for the image?

G Phillipson
GP Computer Services
14 Newton Court
Outwood, Wakefield
W Yorks

Microdrive conversion

Re the Peek & Poke query in the September 13 issue, entitled 'Copy on to Cartridge'.

It is possible to copy *Vu-File*, *Vu-Calc*, and even *Scrabble* to microdrive. R M Jones should write to Draycott, 2 Bedford



Way, Rugeley, Staffs WS18 1LB, which supplies excellent conversion programs for the above (I know as I've used all three successfully).

R M Jones could also try the Kopykat microdrive conversion program—but it will not work on Pinball.

Brian Holden
London

Query answered

I sympathise with John Lawlor (Vol 3, No 35) and Brian Johnson (Vol 3, No 37) with their QL problems. In my experience, Sinclair rarely answer queries. However my Ver 5 is also AH Rom and maybe I can throw some light on *Dline*, *Merge* and the user procedure utility program. Firstly, *Dline* type with no space after D but space after E then Line Number. Example: *Dline* space line number. Enter. This removes the line but easier still and less typing is to type only the line number then press

Enter and hey presto, disappeared, you don't need to type *Dline*.

The user procedure utility program has problems on lines 30318 and 30380 — just edit the word *Merge* on both lines and replace with *Load*. This makes all the functions work correctly.

Now to *Merge*. On the QL it does work but it's not very well explained in the manual. If we start with an example, type: 10 PRINT "OWN NAME" press Enter then type SAVE MDV1. NAME. Now type: 20. PRINT "AND WIFES NAME", press Enter then type: Merge MDV1. NAME and press Enter. Now type Run and on the screen you will see "OWN NAME AND WIFES NAME." You can only merge a program already in memory with one on a microdrive. You cannot merge a program on MDV1 and one on MDV2 without loading one to memory first.

Brian McNulty
14 Millfield Rd.
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Olympia mania

Christina Erskine finds out what's new at the Personal Computer World Show.

The seventh Personal Computer World Show opened its doors on September 19th at its new Olympia venue. Though the show was a little smaller than last year it is nicely timed for the autumn launches, and it is still the show that no-one quite dares to miss.

All the established hardware manufacturers were there—Sinclair, Commodore, Amstrad, Acorn, Act and even Enterprise, which must count as established by now, despite still not having a product in the shops.

The Enterprise 64K computer was on display, though the promised software and peripherals (joystick and monitor) were hardly in abundance. The Enterprise is now priced at £249.00. At its last launch in March, it was intended to be £228.85.

The highlight of the show as far as new machines were concerned was surely the unveiling of the Acorn Business Computer range.

Still no price details available for the computers, but they range from the Terminal, intended as a machine to give Econet access and a terminal emulator, through the Personal Assistant, with View word processor bundled, to the ABC 310, with an 80286 main processor and up to 1 megabyte memory.

Commodore was showing its C16 and the Plus/4, the latter in a low-key way, and Sinclair were selling OLs from the stand. Sales could well have been enhanced by the sight of Psion's 3D Chess program running on the machine, a sophisticated chess simulation which won the World Microcomputer Chess Championship two weeks ago.

Sinclair was also showing a £199 dedicated OL monitor, the Sinclair Vision, manufactured by MBM Data efficiency.

Commodore's new networking system, Compunet, was also much in evidence, and Century Communications announced that it would be putting Essex University's Multi-User Dungeon (MUD) on to Compunet. From October 1, Commodore also showed a primitive music keyboard add-on which clipped onto the C64 and acted directly on to the computer's keys.

Conspicuous by their absence were the MSX companies, which, with one exception, did not exhibit, for reasons best known to themselves. Those people who wanted to see MSX machines could find them by discovering which software houses were launching MSX programs—of which more later. Toshiba's HX-10 and the Sony Hit-Bit were both on show demonstrating MSX software.

The one MSX exception was AVT Gold-

tar's machine, being displayed and demonstrated by its distributors, Micro Dealer UK.

Amstrad's eagerly awaited 3inch Hitachi standard disc drive and interface (see page 5) was shown, if only partly, since most of it was buried in the back of the stand—"We've had to take some precautions—people do walk off with things from shows," explained Amstrad's Bill Poel.

The disc drive will enable users to run CP/M. Digital Research's Dr. Logo is also bundled with it costing £199.00, it should be available in November.

Whatever Atari UK do bring out under the guidance of new chairman Jack Tramiel, it won't be for this Christmas. Nothing new was shown on the stand, which publicised heavily the recent price cuts for both software (games now £9.99) and hardware (800XL is now £199.99).

Together for the first time—Hermann Hauser of Acorn (left) and Sinclair's Nigel Searle.



Most of the larger hardware companies were exhibiting on the ground floor, but up on Level One—which was devoted to business systems—Act's micros made strong display. The FI, F1e, and Portable all made their first public appearances alongside Apricot's more established machines.

Three hardware manufacturers were to be found on the second floor, where most of the home software companies had stands. Memotech had their machines on display—the 32K MTX500 is now £199.00 and the 64K MTX812 £275.00. A wide range of peripherals were also on view.

Oric's stand was notable for its vastness. The Atmos, disc drive, printer and modem were all shown. The last-named however, was not plugged in, and interested visitors to the stand had to be content with gazing at the little black box.

Touchmaster, the company made up of ex-Dragon Data employees and based at its South Wales site, were there in force, showing the Touchmaster graphics tablet,

and a variety of graphics tablet programs in the form of overlays for the keypads including early-learning titles and versions of board games such as *Draughts* and *Othello*. The Touchmaster keypad costs £148.00 and the Touchware £9.99 each. The Touchmaster can interface with the Commodore 64, Vic 20, Dragon, Spectrum and BBC machines.

Rotronics' Spectrum Wafadrive was also being demonstrated, and Audiogenic showed for the first time a similar device for the Commodore 64. At £79.99, or £100 with Audiogenic's *Swift*, *Wordcraft* and *Maggie* packages bundled, the drive, manufactured in Canada, plugs into the Commodore's cassette port. The price undercuts Rotronics' forthcoming Commodore version by some £60.

Apart from its microcomputer, the BBC also had a heavy presence with *The Chip Shop*. Recordings for broadcast on the Radio 4 show were heard on the first three days of the show.

The first day had Paul Bailey (Digital Research) Roger Foster (Act) Hermann Hauser (Acorn) and Nigel Searle (Sinclair) cheerfully lacking audience questions and light-heartedly parrying with each other.

All for were happy to agree that the MSX

standard was very much a Lowest Common Denominator in the micro world—well they would, wouldn't they?—but were far more guarded when asked their opinions of the new Acorn business micros. Hermann Hauser was excused from answering this question.

Paul Bailey was openly appreciative and said they were 'very exciting'—Roger Foster felt that "Acorn will have as much difficulty breaking into the business market as Act would in the home market." It was left to Nigel Searle to openly admit any rivalry and he said, "I wish Acorn luck with them, but I won't say if that's good or bad luck."

The new software was mainly to be found on the second floor, and on emerging at the top of the stairs, it was impossible not to realise that someone had acquired the licence to market *Ghostbusters* as a computer game. On following the sound of the film's theme music, it turned out to be Strangely, it was a first meeting for any of the participants.

continued over the page ▶

Competition

Learn to Fly Competition: Week 4

FLIGHT SIMULATOR. To win a chance to try your hand on a real flight simulator — as used by British Airways — train commercial pilots — all you have to do is send off this 'plane' coupon No 4, together with the three coupons from the three previous issues of PCW and complete the form below. Send the whole lot off to: 'Flight Competition', Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

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Program	RRP	PCW Tick	price box
Nightlife ■	£7.95	£5.50	<input type="checkbox"/>
Heathrow Air	£7.95	£5.50	<input type="checkbox"/>
Traffic Control			
Heathrow Air	£7.95	£5.50	<input type="checkbox"/>
Traffic Control			
Dragonfly II	£6.95	£4.75	<input type="checkbox"/>
Electron	£7.95	£5.50	<input type="checkbox"/>

Name
Address

Name
Address



Show report

continued from page 13

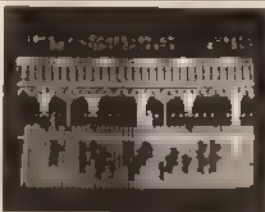
Activision (see page 5) who played the song relentlessly throughout the show. One representative on the stand was moved to remark that here was one record she'd be quite happy never to hear again.

MSX games were demonstrated by, among others, Hudsonsoft, who came to the show all the way from Japan. It had 14 such titles on show, including *Stop the Express*, which has already had some success on the Spectrum. The title was also shown on the C84. Most of its other MSX titles were conventional arcade action but there was also a Mah-jong simulation.

Thorn EMI showed a range of licensed MSX titles, including *Ant Attack*, *Boogaboo*, and *Games Designer* (Quicksilver) *Hustler* (Bubble Bus) and *Les Flies* (PSS). Prices for the range vary, but are between £6 and £8.

A large crowd was continually present at Llamasoft's stand, where Minter was demonstrating *Ancipital* (£7.50), his latest woolly quadruped. This one is a satyr-like creature, half-human, half-goat, trapped in a maze. To get out, the creature must find and collect five key camels and five goats of Power. Wot, no llamas?

New Generation announced its sequel to the highly acclaimed *Trashman—Travels with Trashman*, and an intriguing looking game, *Cliffhanger*, set in the badlands of Arizona, and featuring permutations on that



Travels with Trashman

time-honoured theme of rolling a boulder off a cliff on to someone's head.

Cliffhanger is for Commodore 64 at £7.95, *Travels with Trashman* £5.95 for the Spectrum.

Beyond software had a batch of new releases on show, including the *Lords of Midnight* sequel, *Doomdark's Revenge* and *Ankh*, a fiendishly difficult looking game for the Commodore 64.

Mirrorsoft's menu-driven *Games Creator* for the Commodore 64 shouldn't provide any problems with difficulty. Anyone who can twiddle a joystick can begin developing aliens, heroes and maze configurations to play a variety of arcade-type games. Three different games are included in the package, which you can alter and modify to your heart's content.

Snooker player Steve Davis was the main attraction at the CDS stand, or at least, the game bearing his name was. *Steve Davis*


Snooker gives you the facility to control spin and speed on your shots. The program is to be launched next month on the Commodore 64, Spectrum and Amstrad, with versions for MSX, BBC and Electron to follow.

Level 9 had a couple of new adventures, *Return to Eden* and *The Saga of Erik the Viking*, the last an adaptation from Monty Python's Terry Jones's book. As Erik, you must rescue your family from evil dog fighters in a graphic adventure. *Return to Eden* is the follow-up to the very successful *Snowball*, also an adventure with graphics. *Erik and Return to Eden* will cost £9.95. The latter will be available for Amstrad, Commodore 64, BBC, Spectrum, Mamotech, Oric 1, Lynx and Atari, while *Erik* will be released on BBC, C84 and Spectrum, with an Amstrad version to follow.

Another licensed program, *The Magic Roundabout* was being shown for the first time at CRL's (now CRL Group pic) stand. Billed as non-violent, the scenario involves Dougal (the yellow blob) trying to build a house of sugar cubes, thwarted by the other Magic Garden characters. £5.95 for the Spectrum.

If these were the highlights of the Show, then what of the low points?

Microvitec deserves a fairly hefty rebuke from the RSPCA for promoting its cub colour display monitors by having three live tiger cubs caged at their stand. Don't try and tell me they enjoyed the show.



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DEVS EX MACHINA

WRITTEN AND DIRECTED BY MEL CROUCHER
48K ZX SPECTRUM PROGRAM BY ANDREW STAGG

PLEASE USE THE AUTOMATA ORDER COUPON ON THE BACK COVER

Spreadsheet

Program Mini Office Price
£3.95 **Micro BBC B Supplier**
Database Publications, Europa
House, 68 Chester Road, Hazel
Grove, Stockport SK7 8NY

The facilities provided in *Mini Office* cover all the standard business applications — word processor, database, spreadsheet and graphics programs. It seems sound to offer these as one package, and as such it pro-

vides a complete introduction to a business system. However, anyone intending to make serious use of a business system would be well

vised to study the market carefully and look at the facilities offered by each package before buying. This one would provide an excellent introduction to each kind of program, but could prove frustrating after a while because of its limitations. For example, the word processor does not allow for 'search and replace'; the database is a flat file of maximum 186 records.

In short I would prefer to save up for a more powerful version of each program. However, it represents good va-

lue for money if its limitations can be accepted.

Jan Watterton

ESCAPE...Always returns to this page.

```

00. Large letter editing mode
01. Normal letter editing mode
02. Typing speed in words/minute
03. Print text file
04. Copy on/off
05. Set tab key
06. Save text file
07. Load text file
08. Clear text file
09.....Page end marker.
    
```

vides a complete introduction to a business system.

However, anyone intending to make serious use of a business system would be well

lue for money if its limitations can be accepted.

Jan Watterton

ccc

Traditional

Program Eye of Bain Micro
Spectrum 48K Price £3.95 **Supplier** Artic Computing Ltd,
Main Street, Brandesburton,
Driffield YO25 8RL

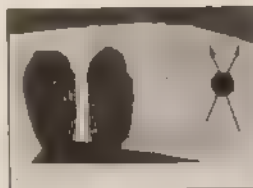
Tarl, the warrior, lies chained to a pole in a grass hut, his mission to find the priceless Eye of Bain cruelly interrupted by savage Alvanians. Only he could escape he could continue, but...

Actually it took this reviewer rather a long time to solve this first puzzle but eventually, with one verb/noun, he was free to roam through this, Artic's Adventure 'F'. Fans of its predecessors will not be disappointed. There are many locations spread around the native village, from tall trees with apes to deep wells with shapeless black beasts. To advance, or even survive, calls for careful

planning.

Author Simon Wadsworth has discarded 'Help' and 'Score' routines, but a useful system of capitals indicates which nouns are recognised.

Eye of Bain also illustrates its locations, and though this does not add materially, the pictures are nicely executed. Thankfully they only appear when cal-



led up, so do not slow down the fast responses to the text commands. In short this program makes no great innovations, but should please anybody looking for a traditional adventure.

John Minson

ccc

Addressed

Program Random Access Mailing Micro BBC B Price £34.99
Supplier Micro-Aid, 25 Fore
Street, Praze, Cornwall

Random Access Mailing from Micro-Aid is a flexible address filing system, its two main functions being the provision of label printing and letterhead addressing routines.

The main options offered by the menu-driven program consist of: data entry, deletion and alteration; hit data; label and letterhead printing; and

data search and sort routines.

The data record consists of a name and address, telephone number, personal contact and record code option, this latter can be used to define a record as business or personal and can include codes to facilitate selective printing of labels etc. Searches and sorts may be performed using the address, telephone number code or contact name.

Thus, the program offers a considerable level of flexibility and control and is aimed therefore at those concerned with, for example, distribution of circulars, market researchers, mail-order operators etc — as well as the general office user,

Night Sky

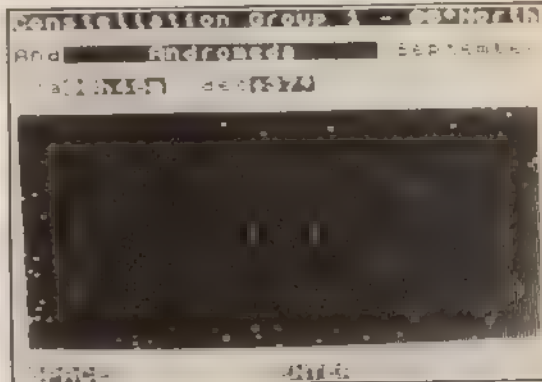
Program Star Watcher Micro
Spectrum 48K Price £15.00
Supplier Brainpower, Triptych
Publishing Limited, Sterling
House, Station Road, Gerrards
Cross, Bucks.

Application through learning is the philosophy of Brainpower, and this lavish package contains two cassettes, or one microdrive cartridge, devoted to educating and aiding the amateur astronomer.

Both programs are menu driven, with displays centred on a broad window in which the stars appear as single or multi-

for any place, at any time, with the application program. This can also simulate a planetarium, moving the heavens by step. A 54 page manual, sensibly designed to stand vertically by the screen, completes the pack. It is written for the beginner and explains the technicalities with admirable clarity.

Sadly, *Star Watcher* seems to have some surprising blemishes. Most entries have a Yes/No double check, but not the 'Exit Program' routine — where it is needed most. More important are discrepancies between the manual and program, including reference to a Teaching Module which is, apparently, not on the tape. If



pixel dots. The education section concentrates on constellation recognition, building up each from its key stars to a full sky picture. A test facility is provided.

The more experienced user can call up a celestial display

Triptych corrected these few faults they would have a versatile educational tool in which the contents, for once, matched the packaging quality.

John Minson

ccc

club secretaries, schools and so on.

It was with some sense of disappointment, therefore, that when running the program I viewed an almost immediate error message "Syntax error at Line 17010". Well, the origin of this was identified, and a point to mention is that if you possess a system operating Basic 1, as opposed to the more recent version, you will have to alter the program *MAILmd*. The modification is minor, changing the semi-colon following the *Inputtab* statement in Line 17010 to a comma (the Basic 1 equivalent) does the trick, then re-saving this *MAILmd* or typing *Goto* ■ in command mode should allow you to proceed.

The data entry routine took some getting used to, a rather constrained format is required to permit the program its level of complexity in the selective search, sort and print routines. The size ■ the data base is dependent upon the disc system available, 525, 1200, 925 and 1785 records on 40 track single density, 80 track single density, 40 track double density and 80 track double density

units, respectively.

In its label printing operation the program provides a very flexible system for configuring label printing to meet the individual's requirements and the formats of various printers. To print letterhead addresses the program is written in such a manner as to allow the address to be added to text-files created using *Wordwise*, in addition to standard blank paper headings. The program will in this option insert the address, date and name (defined as the personal contact) into the text where appropriate.

One peculiarity I found was that when printing an address, the personal contact name, if included in a record, was printed above the address. If the address record also included a name this gave rise to a double name preceding the address. Finally, the personal contact name is limited ■ twelve characters. Thus if you include a title and initial you are likely to get a severely truncated surname appearing.

Simon Wilson



High dive

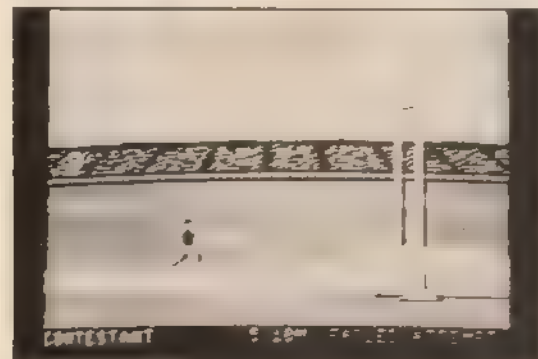
Program Summer Games Micro Commodore ■ Price £19.95 (disc) £14.95 (two cassettes) **Supplier** Quicksilver, Palmerston Park House, 13 Palmerston Road, Southampton, Hants.

Summer Games is another *Track and Field* variant in which you get to play every kind of sporting star known to mankind (the crowd only applauds if you are American

though).

There can be little doubt though that despite the large number ■ similar titles this one is far and away the best.

It was written for the Commodore by the US house *Epyx* and is being marketed in this country by Quicksilver. The success of the game comes from its spectacular graphics. Unlike some of the other variants, this one introduces sports like high diving and gymnastics which require something other than the usual yanking of the joystick.



Psychedelic

Program Sinbad Price £7.95
Micro BBC B Supplier Virgin Games Ltd, Vernon Yard, 119 Portobello Road, London W11.



Quite what Sinbad and a cast of magic carpets are doing in space I cannot imagine, but there they are, and the scenario makes for an original game by Dennis Ibbotson. According to the cassette cover, he has only been programming for six months and hates computer magazines (whoops!).

It contains two different screens which alternate and become progressively harder during the game. The first has a number ■ furry rugs flying around the screen, and Sinbad has to climb on ■ his magic carpet and touch them as he

flies past. A touch changes their colour, although they are still able to knock Sinbad off the carpet, and frequently do so. The aim is to touch them all in as short a time as possible.

When Sinbad has completed his psychedelic experience,

the second screen appears — a 3D view of Sinbad flying through meteors. Sinbad's instant dyeing technique evidently doesn't extend to meteors, so he must avoid colliding with them. The length of time ■ took to clear the first screen determines how long the flight through the meteors will last.

The cover also promises a surprise reward at the end of the game, but that would be telling. The game is pleasant but unexciting.

Jan Watterson



There are various permutations of play available with up to eight players including the computer taking part if you wish. You can practise individual events and, if appropriate and you have a disc, record your world record score.

There is even an opening

ceremony in which a runner arrives ■ light the Olympic flame and white doves of peace are released — no sign of Ronald Reagan or a jetman though.

Ian Waltham



Glued-on

Program Poster Paster Micro Commodore ■ Price £8.95
Supplier Task Set, 13 High Street, Bridlington, Yorks.

Despite having a hero named Bill Stickers — a bad enough pun to be truly offensive — Task Set's new game *Poster Paster* is pretty good.

The simple idea is to move a

ladder about, collect glue, and put up posters avoiding a variety of completely unrelated but entertaining monsters. What makes the game is the realistic way the poster sections unfold to display various ludicrous adverts.

Beyond dodging monsters and positioning ladders there isn't much else to the game and ■ might get tedious after a while.

Ian Waltham



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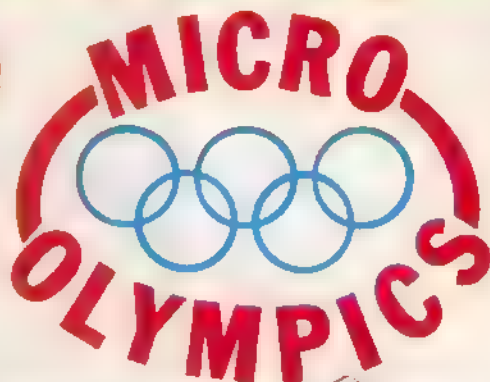
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Name _____

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Post to: Micro Olympics offer, Database Publications,
68 Chester Road, Hazel Grove, Stockport SK7 5WY. PCW 9

The ABC trial

Jeff Naylor previews Acorn's new ABC range of business computers

Acorn's entry into the business machine market—the Acorn Business Computer (ABC)—launched at last week's Personal Computer World Show understandably attracted a great deal of attention.

Seven machines and a terminal-type model were demonstrated, all broadly based around the BBC-with-second-processor technology. At the bottom of the range the machines are provided with a 280 second processor running CP/M. Other options use the 16032 running Xenix and the 80286 giving the ABC IBM PC compatibility.

So far, though, it is impossible to form a firm opinion about the ABC machines since Acorn is playing things close to its chest and has announced no details whatsoever of prices for the new range.

All the ABC models are based around the original BBC design (or Proton as it was called until the lucrative contract appeared). The machines come in two boxes, a main unit containing the discs, monitor, power supply and virtually all the electronics, and a separate keyboard. Whichever type of display black and white or colour—the casing of the main unit appears to be identical.

It is quite large: the Apricot F1 and Macintosh look like half-scale models in comparison. Mounted on a plinth to raise it a few inches, the whole unit is supposed to tilt and swivel but when this was attempted on the pre-production machines it was not as easy as it looked. The ABC is not a light machine and only responded to brute force.

The disc drives are mounted beneath the screen. A Winchester hard disc presents you with a blank panel, broken only by a couple of LEDs. The floppy drives have a very solid lever for locking the discs in place. Acorn have taken great trouble in selecting a manufacturing source for these drives, and the type finally settled on have "passed all the tests with flying colours", to quote one of the designers. They are made by Teac, although nobody is supposed to know that.

The main circuit board for the ABC lies across the bottom of the case. The BBC circuit layout has been completely redesigned for the new series of machines, but the chips are the same. In terms of configuration, the ABC is a Model B BBC machine with Econet and disc interface. Compatibility was obviously the watch word of the design team. The new board has been designed to cope even with "dirty" programming tricks used by software authors on the BBC such as reconfiguring the display controller chip.

Where this compatibility may fail is with the disc operating system. It is no secret that the Acorn disc filing system is based around a controller chip that is now con-

sidered obsolete, even by its manufacturer. Consequently, the ABC computer is equipped with a new disc system which is bound to be an improvement, but may just cause the odd problem.

There are six, as opposed to five, side-ways Rom sockets, and these are capable of taking the 16K Roms or Eproms used on the BBC. A quick modification allows them to accept 32K chips instead. The main, or mother, board is standard throughout the range, except that I was left with the impression that the 300 series machines may have some alterations. Whether this is to do with running Concurrent CP/M or for the operation of mouse and modem was not clear.

Green-screen display

Either side of the monitor chassis—inside the case—are two card-holding frames: the second-processor boards and other additions are housed here. Space has also been left inside the case for the additional electromagnetic screening that is required by American interference regulations. This may limit the size of boards that third-party manufacturers can use. Cards for things such as Ram discs can be quite large so they may have to be plugged into the 1MHz bus and sulk around behind the machine.

The display section and power supply are housed in a pivoted frame: with the cover removed it may be hinged up to make servicing and modifications easy. In addi-

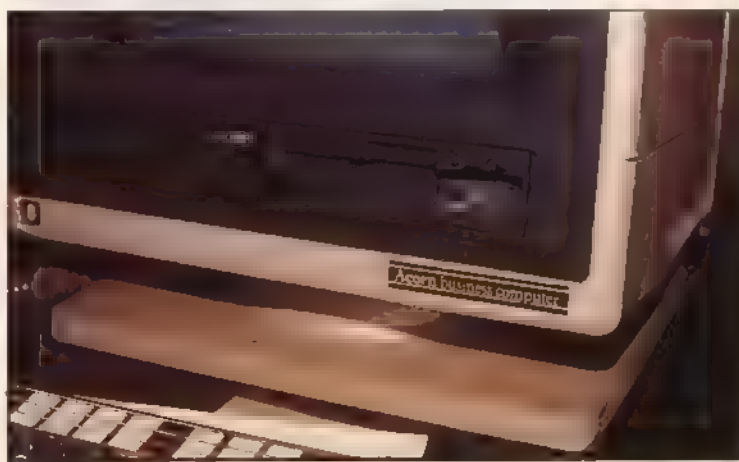
Acorn designer claimed that he can get into the machine in 15 seconds.

The monochrome machines have a 12-inch green-screen display that is both clear and steady. The colour tubes (12 inch again) are described as hi-resolution and high contrast: the pictures they produce can only be described as excellent. Returning to the outside of the case, there are both RGB and composite video sockets lurking around the back. The monochrome models produce colour signals, so I expect that their RGB outputs will be welcome to those who want colour but can't afford a hard disc as well. The video signals are not buffered, so plugging a second RGB monitor into a colour model may interfere with the built-in screen's circuitry. With the monochrome models the same may happen with the composite video output, but in both cases it would not require a very complex add-on to overcome the problem.

The backs of all the machines have the same collection of input and output sockets. Prominent is the 1 MHz bus expansion connector. With this you may add external devices, such as your own hard disc drive. Econet comes as standard, as do serial and parallel ports and an analogue socket. A tape socket indicates that a cassette interface is still provided, despite the fact that all the models are equipped with discs. This is not surprising, considering the origins of the design and compatibility aspirations with the Beeb computer, but please take note, Sinclair Research.

In addition there is a power switch and keyboard connector. This last item is a locking "D"-type socket, so the keyboard should never come adrift accidentally.

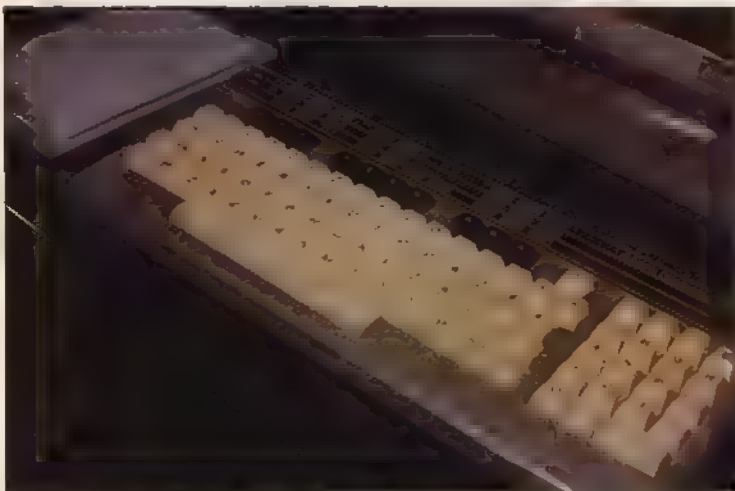
Running between the main unit and the



tion, the computer can actually continue to run in this position as no jumper leads need to be disconnected, so you will have the chance to give yourself all the electric shocks you want.

Getting into the machine to work on it is something that has been well thought out: an

keyboard is a curly, 18-way wire. Acorn were pleased to find that British Telecom used such an item, and put it to good use. The extension signals to the keyboard are buffered, but otherwise they follow the same format as the Beeb. The keyboard itself contains only a little electronics. The



unit is slim and stylish and much thought has gone into the layout. The function keys are in a row along the top, but have been grouped in three blocks. It was thought that finding the right key would be made easier if they were grouped with gaps between F2 and 3 and F6 and 7.

BBC users will not find the cursor keys where they would expect, as they are grouped top right of the main Qwerty layout. Further right is a key-pad that not only contains numbers but also Plus, Minus, Divide and Multiply as well as an extra, double-sized return key. The keyboard gave a decidedly professional impression, and you get the same unit whatever model you buy.

A program break

There is no break key visible, a good idea for a computer that may spend little of its working life having programs written and debugged on it. If you peek at the back of the keyboard, however, a hole is revealed that fingers will have difficulty penetrating: poking a pencil in here will cause a break of the program (not the pencil). There is another switch behind the keyboard which can be used to toggle the way the machine operates. You can switch the second processor in and out (if fitted) and all that entails; if the Tube LED is not lit then you are left with a standard machine—however much you paid for it.

Having looked at the hardware components, let's now turn to the various options available. At the very bottom of the range is a machine that isn't really an ABC, but a terminal. At present it even has a 1/4 inch screen. Of interest is potential network customers, it is the least up-gradable of the range. Next comes the Personal Assistant. If you are considering buying a BBC machine with disc drive for word processing then hang on until the price of this model is announced—I am told that they will be

comparable, and with the Personal Assistant you are getting a much better product. It will be capable of running any BBC or Electron software (given that a disc filing problem does not emerge). In addition to a double-sided, double-density disc drive capable of storing 670K, you also get *View*,

Acorn's own word-processing package and *ViewSheet*, a spreadsheet. Both programs are in sideways Rom.

The other machines in the range can all be turned into this base model with the switch described earlier, although they will have better disc options and will not have the sideways Roms as standard.

The ABC 100 is the monochrome Z80 second-processor option with twin floppy drives (1480K total capacity). It uses the second-processor method as used on the Beeb, with the 6502 handling screen, keyboard, etc and the Z80 doing the clever stuff. The processors communicate via the same Tube interface as used on BBC. The ABC 110 is a 100 with a colour display and hard, 10 Mbyte, disc replacing one floppy. Both Z80 machines can handle CP/M and come with a full set of bundled software.

The ABC 200 series use the National Semiconductor 32016 chip as the second processor. This is an advanced chip—32 bits internally with 16-bit data and 24-bit address buses. The 200s are best described as technical work stations, as they support a wide range of languages including C and Pascal. Acorn hope to equip the colour and hard disc option, the ABC 210, with the Xenix operating system. The licences have

yet to be obtained for some of the software.

Finally the 80286 second-processor of the ABC 300 and 310 models is compatible with the 8086 and 8088 CPUs used by the IBM PC and its various clones. Proudly described as "not a PC compatible machine, a PC eater", the 300s are the executive machines, with a Concurrent (ie, multi-tasking) operating system and a software user interface called the *Desk Top Manager*. The front end of the Apple Ix and Macintosh are the obvious inspirations for the *Desk Top Manager* Graphic representation of sheets of paper overlapping on a desk, a mouse pointing at icons, and pull-down menus.

Whichever of the popular operating systems you may already be using, the 300s should cope: they can read virtually any disc format, although this may require some programming skills. The price of the 300s is claimed to under-cut the cost of equivalent IBM pc systems at around £3,500.

Pull-down menus

Perhaps the most interesting of the ideas behind the ABC is the possibility of upgrading from the lower end of the range to a top end machine. It should also be possible



to leave your old second processor in place when adding the next one up the range.

This would allow, for example, the CP/M Z80 option to remain in place when upgrading to the 200 specification.

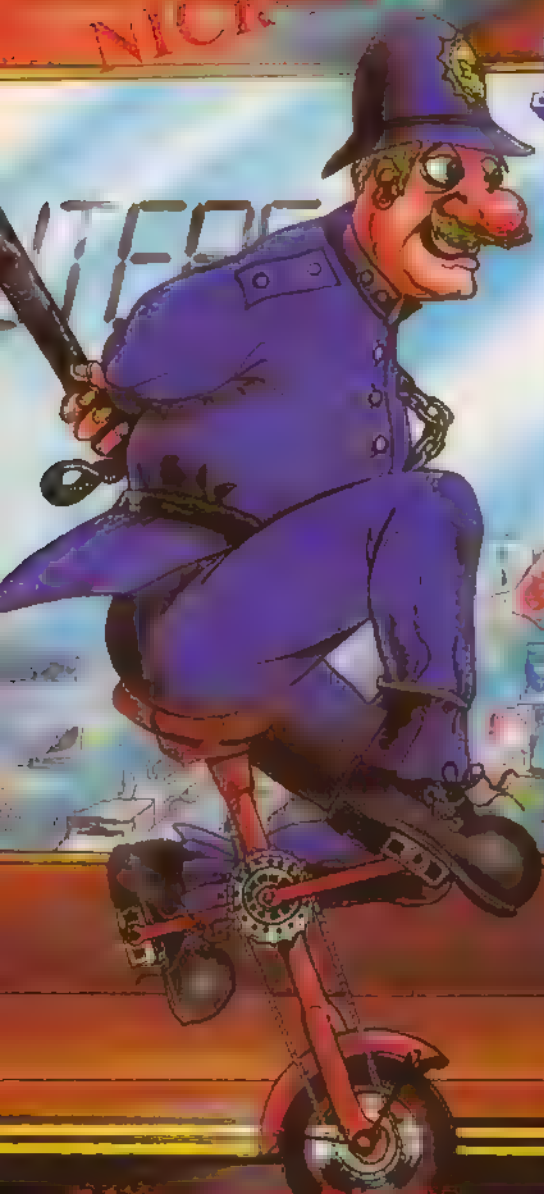
The ABC range has been under development for about a year now and field trials began in May. The computers on display at the show were pre-production models, but production is due to start in November with deliveries in January.

Although Acorn has done a good deal of market research, it is not too late for dealer and public reaction to modify the final packages. It is the dealers who will have the most say in what ends up in the showrooms.

First impressions of the machines are favourable. It is not exactly an elegant machine, physically, but the power of twin processors cannot be dismissed. Until prices are known, though, it is difficult to compare the range with other products.

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Pocket programs

Hardware Psion Organiser Price £99.95 Supplier Psion ■ Dorset Square, London NW1 1YP.

Even with the gilt now rapidly wearing off the home computer gingerbread, there still appears, once in a longish while, a product which bears the stamp of an original and very bright idea. Into that category comes the first piece of hardware produced by software company Psion. After several weeks of using the Psion Organiser I'm no longer breathless with admiration, but I am still a fan.

This machine makes an ambitious advertising claim to be "the world's first practical pocket computer", a slogan brazen enough to make several other manufacturers, not least Casio and Epson, foam at the mouth. The claim stems from the fact that with the Organiser, unlike any of the others so far on the market, large amounts (up to 16K in each of two "drives" or cartridge slots) of non-volatile memory are available for addresses and other reference data, including information for use with special "program packs" which come together with Psion's own programming language.

For the basic £99.95 you get the computer, complete with built-in operating system, and 14K of RAM. 16 character scrolling LCD display, alpha-numeric keyboard with a sophisticated calculator (including a built-in clock) two cartridges including a blank 8K unit for data.

The blank cartridges, called "datapaks" coming in 8K or 16K form, are *Eproms*. Information saved to them is thus preserved even when the machine is switched off. Equally it has to be remembered that once

data has been saved, using the special "save" key, that area of memory is committed unless the entire cartridge is reformatted.

The Organiser has a built-in database function, using the "find" key which will find any existing entries containing a specified string of characters. With a 16K *Eprom* full of information to sort through, I found the longest wait was about five seconds, and retrieval usually came very much faster. The scrolling screen, which can move forwards or back and, when using the "finance" pack, up and down as well, makes the most of the limited display.

Popl, standing for Psion Organiser Programming Language, bears some resemblance to a drastically curtailed version of BBC Basic. There are programs of up to 200 bytes. Numeric variables global and local are catered for as is Goto and a limited IF facility as well as a Loop command. The Finance Pack has built-in procedures for advanced mathematical and scientific calculations as well as more specialised tasks.

In general the Organiser is a user-friendly machine with the number of built-in commands simple enough to grasp and easily accessible. But, just as many of the advantages of the machine stem from its use of *Eproms*, so do the major drawbacks. I discovered these after I saved information about a company to the blank datapak and, a day later, remembered that there was

another office whose number I was also likely to need. But, once an entry has been saved, there is no way of adding to it without rewriting the whole entry and losing the



memory space of the original.

The "find" key will default to looking at cartridge 1 unless "2" is specified, and copying data from one datapak to the other is straightforward using the "save" key, if sometimes a little laborious.

The three 16K program packs, for maths, science and finance, cost £29.95 apiece and more are being developed, and there will also be a £39.95 RS232 interface to link the Organiser with a modem and transfer information to other computers or to connect it to a suitable printer.

All in all, a machine which, at the price, should find instant appeal in the executive market and, depending on the packs developed, could soon develop a wider appeal. When, that is, one ludicrous and glaring fault has been corrected. You won't believe it but, the damn clock loses up to 20 minutes per day.

Barbara Conway

A Sharpe

Hardware/Program Musicom ML-10 Centronics Interface/Musicom software Micro Spectrum plus Casio MT 200 music keyboard Price £43 (for the ML-10 unit) £9.95 (for the music software) Supplier Micro Musical, 37 Wood Lane, Shilton, Coventry CV7 9LA.

While back PCW looked at the Casio MT200 — a portable keyboard that could be linked with any micro that had, or could be fitted with, Centronics interface.

At the time all there was by way of software was whatever you could manage to create yourself using the grotty manual that came with the Casio PA 1 interface.

Micro Musical is a company that specialises in developing, with both hardware and software, computer-music links and it is from them that the first sensible software for

the MT 200 comes.

Its Musicom (minus points for naff name, Micro Musical) program enables you to enter, edit, repeat, and transpose music in up to eight parts and switch from any of the MT200's six rhythms and eight tone settings.

The notation for the music is not conventional dots and staves — although there is a promise of a music stave version in a couple of months. Instead, notes are referred to by letter and a number which determines which octave they fall in, eg. A2 is the lowest A the Casio can play. Micro Musical have replaced the ludicrous Casio system of using upper and lower-case letters for sharps and flats with a far more sensible + or - . For example, +A2 is A sharp.

However, it doesn't end there. If you use appropriate note values all the music can be automatically timed to the 'clock' that drives the rhythm unit — so you can't fail to be in time even if, as often happens, the beat doesn't quite fall where you thought.

It's easy to get the program to do something simple but if you want to get into some really nifty funky stuff using the disco setting you will have to do quite a bit of



experimenting with shortened notes and different rest lengths.

The only real problem with this package is that it is designed to work with a special Centronics interface Micro Musical have designed for the Spectrum called the ML 10 which cannot be used for ordinary printing purposes. Doubtless a lot of people out there will already have a Centronics interface and won't want to buy another.

The software may not work quite as straightforwardly with your particular interface, although Micro Musical are pretty helpful at sorting out such problems.

Graham Taylor

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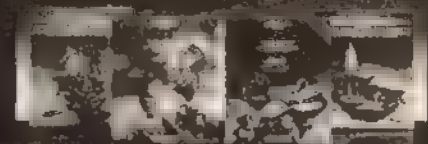
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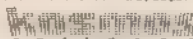
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Expand your attributes

Two new keywords for Interface 1 by B J Lowry

Any Spectrum Owner with Interface One will probably be aware of the Basic Extension facility the extra system variable Vector (Address 23735 & Address 23736) offers. Most Spectrum owners will also be aware of the lack of Basic commands to manipulate the attribute file, which at present can only be accessed via *Pokes* (hardly an aid to debugging) or via a *Print* statement, which can be inconvenient.

The following machine code program is a way of using Basic Extension to give a greater flexibility when manipulating the attribute file from Basic. The program defines two new Basic keywords:

a) ATTR * I,P,C,L

Where: I Ink (In the range 0-7)

P Paper (In the range 0-7)

C Column (In the range 0-31)

L Line (In the range 0-23)

b) ATTR @ L,C,N,F,L,P

Where: L Start line (In the range 0-23)

C Start column (In the range 0-31)

N No of Characters per line (In the

range 1-32)

F No of Lines duration (In the

range 1-24)

I Ink (Range as before)

P Paper (Range as before)

Keyword a will allow the user to specify the ink and paper of any screen position (including the bottom status lines), without destroying anything printed there previously, by specifying the position in column/line co-ordinates.

Keyword b allows the user to define a rectangle of colour, of width N and length F that begins on Line L at column C, without destroying anything printed previously.

Although both new statements only act on the ink and paper, the user can incorporate flash and bright. This is done by preceding the new statement with a line that sets the flash/bright on, and then immediately after the new statement inserting a line that sets flash/bright off. The user is able to do this because both commands access the system variable attr p (address 23693) and pick up the flash and bright bits.

The machine code is 413 bytes long, and I have located it above Ramtop at starting address of FD8C (hex), 64860 (dec). For those of you without an Assembler, I have included a decimal dump of the code and a small Basic program to load this routine.

Enter the Basic loader and run it. The computer will ask you to input each number from the dump from left to right, eg, starting with 218 then 24 then 0 then 284 then 171. After five numbers the computer will display the sum (in the case of the first line 844). If the number agrees with the sum for that line on the printout, the line is ok and you can enter the next line. After entering the code it should be saved before testing. Save as: Save "Name" Code 64860,413. After saving the code, New the computer and enter Lines 10 and 11 of the example program. Run these lines, Load back the code previously saved, then enter the rest of the example program. When entered, the program can be run by typing Goto 14, and pressing Enter.

One thing must be noted when using the new commands. Do not forget to change the system variable vector before trying to use them. Simply Poke 23735,92 and Poke 23736,253 at the beginning of any program that uses the commands, and don't forget to load the code.

```

000000 : Zeus Assembler Listing
000001 :
000002 : DATE: 17/06/84
000003 :
000004 : Extending BASIC
000005 : -----
000006 :
000007 : (C) 1984 B J LOWRY
000008 :
000009 : ATTR*I,P,C,L
000010 :
000011 : ATTR@L,C,N,F,I,P
000012 :
000013 : ORG $F0BC
000014 : SYN RST 15 : Page ROM
000015 : DEFS 00010 : Get Char
000016 : CP 171 : Is it ATTR
000017 : JP Z,AT3 : Yes Jump
000018 : JP R01F1 : No, Error!
000019 : ATB RST 16 : Page ROM
000020 : DEFS 00020 : Next Char
000021 : CP 48 : Is it '0'
000022 : JP NC,NXT : No, Try '1'
000023 : R01 16 : Page ROM
000024 : DEFS 00020 : Next Char
000025 : RST 16 : Page ROM
000026 : DEFS 01C82 : Get LINE
000027 : CP 44 : Comment?
000028 : JR Z,BN1 : Yes, Jump
000029 : ER2 RST 32 : No, Error!
000030 : DEFS 0 :
000031 :
000032 : BN1 RST 15 : Page ROM
000033 : DEFS 00020 : Next Char
000034 : RST 16 : Page ROM
000035 : DEFS 01C82 : Get COLUMN
000036 : CP 44 : Comment?
000037 : JR NZ,ERR : No, Error!
000038 : RST 16 : Page ROM
000039 : DEFS 00020 : Next Char
000040 : RST 16 : Page ROM
000041 : DEFS 01C82 : Get PAPER
000042 : CP 44 : Comment?
000043 : JR NZ,ERR : No, Error!
000044 : RST 16 : Page ROM
000045 : DEFS 00020 : Next Char
000046 : RST 15 : Page ROM
000047 : DEFS 01C82 : Get INK
000048 : CALL $B5B7 : Exit in
000049 : Syntax Time
000050 :
000051 :
000052 : Run-time Module
000053 :
000054 :
000055 :
000056 : ORG $0000
000057 : POS RST 15 : Page ROM
000058 : DEFS 01E94 : Get Line n
000059 : CP 24 : Is it in
000060 : JR NC,ERR : Range?
000061 : LD BC,31 : Initialise
000062 : LD DE,0 : the
000063 : LD HL,0 : Registers!
000064 : LD E,A : Save L,P
000065 : PUSH DE : & increment

```

```

000066 : PUSH BC : before ROM
000067 : RST 15 : Page ROM
000068 : DEFS 01E94 : Get Column
000069 : CP 32 : Is it in
000070 : JR NC,ERR : Range?
000071 : POP BC : Restore
000072 : POP DE : Line/Incr
000073 : LD D,0 : Save COLUMN
000074 : LD HL,23693 : ATTR base
000075 : LD A,0 : ZERO, & CNT
000076 : CALC CP E : & line n?
000077 : JR Y,ENDC : Yes, Jump
000078 : INC A : CNT+CNT+1
000079 : ADC HL,BC : Add Offset
000080 : JR RLC : Round again
000081 : ENDC LD B,0 : COL Offset
000082 : ADC HL,BC : Add it in
000083 :
000084 : Registers HL contain the
000085 : address of the attribute
000086 : byte to be changed
000087 :
000088 : Now for PAPER & INK :
000089 :
000090 : COLS PUSH HL : Save Addr
000091 : RST 15 : Page ROM
000092 : DEFS 01E94 : Get PAPER
000093 : CP 0 : Is it in
000094 : JR NC,ERR : Range?
000095 : LD DE,0 : ZERO, & DE
000096 : LD D,A : Save PAPER
000097 : PUSH DE : & Addr
000098 : PUSH HL : before ROM
000099 : RST 16 : Page ROM
000100 : DEFS 01E94 : Get INK
000101 : CP 0 : Is it in
000102 : JR NC,ERR : Range?
000103 : POP HL : Restore
000104 : POP DE : Paper, Addr
000105 : LD E,A : Save Ink
000106 : LD BC,0 : Initialise
000107 : LD HL,0 : Registers!
000108 : LD A,0 : ZERO, & CNT
000109 : SUM RLC : & Shift the
000110 : RLC : Bits to
000111 :
000112 : RLC : Get P&B
000113 : ADD A,E : Add in INK
000114 : LD HL,23693 : Add in
000115 : LD E,A : & Ink
000116 : LD R,(HL) : & Bright
000117 : AND AC0 : & Flash
000118 : OR E : & Bits
000119 : POP HL : Get AttrAddr
000120 : LD HL,(HL) : & Attr
000121 : JP $B5C1 : Finish
000122 :
000123 :
000124 :
000125 :
000126 :
000127 :
000128 :
000129 :
000130 :
000131 :
000132 :
000133 :
000134 :
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00129 RST 40
00130
00131 NXT CP 54 Is it 'e'
00132 JP NZ,ERR No, Error?
00133 RST 15 Page ROM
00134 DEFU #0020 Next Char
00135 RST 15 Page ROM
00136 DEFU #1C82 StartLINE
00137 CP 44 Cobas?
00138 JP NZ,ERR No, Error?
00139 RST 15 Page ROM
00140 DEFU #0020 Next Char
00141 RST 15 Page ROM
00142 DEFU #1C82 Start COL
00143 CP 44 Cobas?
00144 JP NZ,ERR No, Error?
00145 RST 15 Page ROM
00146 DEFU #0020 Next Char
00147 RST 15 Page ROM
00148 DEFU #1C82 N/O Chars
00149 CP 44 Cobas?
00150 JP NZ,ERR No, Error?
00151 RST 15 Page ROM
00152 DEFU #0020 Next Char
00153 RST 15 Page ROM
00154 DEFU #1C82 EndLINE
00155 CP 44 Cobas?
00156 JP NZ,ERR No, Error?
00157 RST 15 Page ROM
00158 DEFU #0020 Next Char
00159 RST 15 Page ROM
00160 DEFU #1C82 INK
00161 CP 44 Cobas?
00162 JP NZ,ERR No, Error?
00163 RST 15 Page ROM
00164 DEFU #0020 Next Char
00165 RST 15 Page ROM
00166 DEFU #1C82 PAPER
00167 CALL #0067 SyntaxEND

```

```

00168 PAPER RST 15 Page ROM
00169 DEFU #1E94 Get PAPER
00170 CP 8 In range?
00171 JP NC,ERR No, Error?
00172 LD 0,A Store it
00173 PUSH BC Save it
00174 RST 15 Page ROM
00175 DEFU #1E94 Get INK
00176 CP 8 In range?
00177 JP NC,ERR No, Error?
00178 POP BC Get PAPER
00179 LD C,A Save INK
00180 PUSH BC end PAPER
00181 RST 15 Page ROM
00182 DEFU #1E94 EndLINE
00183 CP 25 In range?
00184 JP NC,ERR No, Error?
00185 LD 0,A Store it
00186 PUSH DE Save it
00187 DEFU #1E94 Page ROM
00188 CP 30 N/O CHARS
00189 JP NC,ERR No, Error?
00190 POP DE EndLINE
00191 LD C,A Save EL &
00192 PUSH DE N/O CHARS
00193 RST 15 Page ROM
00194 DEFU #1E94 StartCOL
00195 CP 32 In range?
00196 JP NC,ERR No, Error?
00197 LD 0,A Store it
00198 LD 0,A Save it
00199 PUSH HL Page ROM
00200 RST 15 StartLINE
00201 DEFU #1E94 In range?
00202 CP 24 No, Error?
00203 JP NC,ERR No, Error?
00204 POP HL StartCOL
00205 LD 0,A Save SL
00206 POP DE
00207 POP BC
00208
00209

```

NOW THE REGISTERS CONTAIN

```

00210 M = Start Column
00211 L = Start Line
00212 E = End Line
00213 C = Number of Chars
00214 B = Paper
00215 D = Ink
00216
00217 CALL DEARS :EARScheck
00218 PUSH BC :Calculate
00219 PUSH DE :the ATTR
00220 LD BC,31 :start
00221 EX DE,HL :Address
00222 LD HL,25520
00223 LD A,0
00224 CLC
00225 JP Z,EC1
00226 INC A
00227 ADD HL,BC
00228 JR CLC
00229 LD E,D
00230 EC1 LD D,0
00231 ADD HL,DE
00232
00233 HL = ATTR Start Addr
00234
00235 POP DE
00236 POP BC
00237 PUSH DE
00238 PUSH HL
00239 LD A,B
00240 RLCA
00241 RLCA
00242 ADD A,C
00243 LD E,A
00244 LD A,(23593)
00245 AND BC0
00246

```

```

00247 OR E
00248 LD (23595),A
00249
00250 System Variable ATTR T
00251 contains New ATTR
00252
00253 POP HL
00254 POP DE
00255 PUSH HL
00256 PUSH DE
00257 LD B,1
00258 LD C,0
00259 POP DE
00260 POP HL
00261
00262 HL = BASE ADDRESS
00263 BC = END ADDRESS
00264 E = N/O CHARS
00265
00266
00267 RGN LD D,1
00268 LD A,(23595)
00269 LD A,(INL),A
00270 LD A,0
00271 GR Z,ELN
00272 INC HL
00273 INC D
00274 JR RGN
00275 ELN LD A,0
00276 CP C
00277 JP Z,FIN
00278 LD D,3
00279 PUSH DE
00280 LD D,0
00281 LD E,32
00282 ADC HL,DE
00283 POP DE
00284 PUSH DE
00285 LD D,0
00286 SBC HL,DE
00287 POP DE
00288 INC B
00289 JR RGN
00290 FIN JP #00C1
00291 CERRS PUSH DE
00292 PUSH DE
00293 PUSH HL
00294 PUSH DE
00295 LD A,A
00296 ADC A,E
00297 CP 34
00298 JP NC,END
00299 LD A,L
00300 ADD A,D
00301 CP 20
00302 JP NC,ERS
00303 POP HL
00304 POP BC
00305 POP DE
00306 RET

```

```

1 REM Example program
2 REM using the new commands
3 REM
10 CLEAR 64000
11 POKE 23735,99: POKE 23736,2
53 1R REM run above before
entering the rest
13 REM
14 PRINT AT 7,7:"A"
15 PRINT AT 1,0:"press a key":
PAUSE 0
16 ATTR 65,5,7,7
17 PRINT "ATTRs"
18 PAUSE 0: CLS
19 PRINT AT 11,3:"a block of c
olour": PRINT AT 1,0:"press a ke
y":
PAUSE 0
21 ATTR 0,0,0,0,7,2,1
22 PRINT "ATTRs"
23 PAUSE 0: CLS: PRINT AT 10,
0:"with FLASH & BRIGHT": PAUSE 0
24 FLASH 1: BRIGHT 1
25 ATTR 0,0,0,0,1,2,7
26 FLASH 0: BRIGHT 0
27 STOP

```

```

1 REM BASIC LOADER
2 REM
10 CLEAR 64000: LET B=64000
20 DIM A(5)
100 LET C=1
110 INPUT "Byte>>";B
111 IF A(C) OR A(255) THEN PRINT
50 AT 0,0:"BAD BYTE!-ENTER AGAIN
": DEEP .5,-24: PAUSE 50: GO TO
110
112 LET A(C)=A
113 PRINT A
114 LET C=C+1
115 IF C=5 THEN LET C=1: GO SUB
200
116 IF B=B+415 THEN GO TO 1000
122 GO TO 110
200 LET SUM=0: FOR X=1 TO 5
210 LET SUM=SUM+A(X): NEXT X
211 PRINT "SUM=";SUM: IF OK
PRESS 0,IF NOT,1"
212 PAUSE 0
213 IF INKEY$="" THEN GO SUB 3
00
214 IF INKEY$="1" THEN PRINT 50
AT 0,0:"CANCELLED LAST LINE,ENT
ER AGAIN": DEEP .5,-24: PAUSE 50

```

Continued over the page


```

RETURN
205 RETURN
300 FOR X=1 TO 5: POKE B+X,AIX
NEXT X: LET B=B+8: PRINT "NEXT
LINE": RETURN
1000 CLS: PRINT " ALL THE MACH
INE CODE HAS BEEN ENTERED, PLEASE
SAVE BEFORE RUN-NING"
1001 PRINT: PRINT "SAVE AS .":
PRINT "SAVE "+CHR$ 34+"NAME"+CHR
$ 34+"CODE 64000,413"
1002 STOP

```

```

***DECIMAL DUMP***

```

0185	0	0	254	171	SUB	8564
0282	0	0	195	241	SUB	8584
0300	0	0	0	215	SUB	8582
0300	0	0	0	215	SUB	7808
0300	0	0	0	215	SUB	4885
0300	0	0	0	215	SUB	57
0300	0	0	0	215	SUB	4582
0300	0	0	0	215	SUB	4080
0300	0	0	0	215	SUB	4582
0300	0	0	0	215	SUB	5985
0300	0	0	0	215	SUB	551
0300	0	0	0	215	SUB	178
0300	0	0	0	215	SUB	58
0300	0	0	0	215	SUB	720
0300	0	0	0	215	SUB	52
0300	0	0	0	215	SUB	593
0300	0	0	0	215	SUB	337
0300	0	0	0	215	SUB	45
0300	0	0	0	215	SUB	52
0300	0	0	0	215	SUB	983
0300	0	0	0	215	SUB	30
0300	0	0	0	215	SUB	21
0300	0	0	0	215	SUB	76
0300	0	0	0	215	SUB	524
0300	0	0	0	215	SUB	129
0300	0	0	0	215	SUB	184
0300	0	0	0	215	SUB	182
0300	0	0	0	215	SUB	584
0300	0	0	0	215	SUB	918
0300	0	0	0	215	SUB	55
0300	0	0	0	215	SUB	555
0300	0	0	0	215	SUB	77

121	253	115	32	0	SUB	521
122	253	115	264	44	SUB	671
123	121	264	115	32	SUB	615
124	121	109	264	32	SUB	827
125	194	121	215	115	SUB	858
126	121	121	115	33	SUB	485
127	254	44	184	191	SUB	687
128	32	44	121	139	SUB	592
129	254	44	194	139	SUB	541
130	254	44	32	115	SUB	716
131	254	215	44	164	SUB	658
132	254	215	32	85	SUB	522
133	139	215	268	183	SUB	781
134	215	178	31	15	SUB	892
135	215	178	31	197	SUB	499
136	139	318	54	8	SUB	658
137	183	193	78	197	SUB	893
138	183	183	31	197	SUB	879
139	318	284	313	215	SUB	714
140	318	284	35	46	SUB	513
141	289	215	215	215	SUB	874
142	289	318	46	15	SUB	515
143	289	284	318	183	SUB	827
144	289	24	219	157	SUB	675
145	284	111	189	193	SUB	863
146	284	234	197	213	SUB	189
147	284	234	31	197	SUB	389
148	30	62	9	187	SUB	337
149	30	68	237	74	SUB	416
150	240	22	8	984	SUB	415
151	289	193	313	3	SUB	942
152	289	193	3	378	SUB	378
153	289	59	141	92	SUB	615
154	289	179	289	143	SUB	794
155	289	289	289	613	SUB	813
156	289	289	289	289	SUB	515
157	289	289	143	92	SUB	318
158	289	289	289	289	SUB	472
159	289	289	289	289	SUB	472
160	289	289	289	289	SUB	287
161	289	289	289	289	SUB	771
162	289	289	289	289	SUB	638
163	289	289	289	289	SUB	638
164	289	289	289	289	SUB	188
165	289	289	289	289	SUB	686
166	289	289	289	289	SUB	686
167	289	289	289	289	SUB	686
168	289	289	289	289	SUB	1178
169	289	289	289	289	SUB	686

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




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Fans for the memory

Graham Paterson shows you how to get things moving on the Amstrad CPC 464

This program demonstrates how the Amstrad can use *Ink* statements to obtain animation in a similar way as that on the BBC machine.

I have used Mode 0 to obtain the maximum number of *inks*, although only seven colours are used.

The overall routine draws three fans, two of which are identical in colour. Then all the *Ink* statements are altered in sequence to obtain the desired effect of animation.

Program Notes

- 20-70 Sets the origin of graphics cursor and all delays, counters and ink colour variables
- 80 Print title
- 90-100 Assigns ink colours for starting
- 110-320 Draws the Fan using different inks and colours for a particular section of the Fan
- 330 Moves to counter
- 340-370 Assigns alternate inks with respective colours
- 400-410 Checks counter
- 420-440 Depending on counter, changes graphics cursor position, the *Ink* number being used and its colours
- 460-520 Changes all the *Ink* statements to sequential colours using for next loop to slow speed down. Creates the animation
- 530-560 Sound routine for fan movement

It should be noted that this program was originally developed from one that displayed cylinders. This may be observed if the *Draw* command in Line 140 is change to *Plot* and the *Rem* removed in Line 150.

```

10 REM:ANIMATED FANS
20 x=320 y=200
30 z=200 t=0 u=90 v=150
40 l=35 a=1 b=2 c=3 d=4 e=7 v=24 g=20 h=0
50 MODE 0
60 BORDER 0:INK 0,0
70 CLS
80 LOCATE 4,1 PRINT"AMSTRAD FANS"
90 t=t+1:z=z
100 INK f,1
110 FOR p=1 TO 360
120 DEG
130 MOVE x,y
140 DRAW x+z*COS(p),y+1*SINK(p),f
150 REM:DRAWR 0,s,f
160 IF p<22.5 THEN GOSUB 350
170 IF p<45 THEN GOSUB 360
180 IF p<67.5 THEN GOSUB 370
190 IF p<90 THEN GOSUB 340
200 IF p<112.5 THEN GOSUB 350
210 IF p<135 THEN GOSUB 360
220 IF p<157.5 THEN GOSUB 370
230 IF p<180 THEN GOSUB 340
240 IF p<202.5 THEN GOSUB 350
250 IF p<225 THEN GOSUB 360
260 IF p<247.5 THEN GOSUB 370
270 IF p<270 THEN GOSUB 340
280 IF p<292.5 THEN GOSUB 350
290 IF p<315 THEN GOSUB 360
300 IF p<337.5 THEN GOSUB 370
310 INK f,1
320 NEXT p
330 GOTO 380
340 f=a:z=1:z RETURN
350 f=b:v=1:v RETURN
360 f=c:l=1:l RETURN
370 f=d:h=1:h RETURN
380 REM
390 t=t+1
400 IF t<2 THEN GOTO 430
410 IF t<3 THEN GOTO 440
420 x=120 y=300 z=50:z=50:l=25:a=5 b=5:c=7 d=8:e=26:v=11:g=6:w=11:e GOTO 90
430 x=500 y=300 l=75:GOTO 90
440 a=1 b=2 c=3 d=4:e=5:v=6:g=7 h=8
450 EVERY 5 GOSUB 340
460 INK a,24 INK b,7:INK c,0 INK d,20:INK e,0 INK v,26 INK g,11 INK h,6
470 FOR q=1 TO w:NEXT
480 INK a,20 INK b,0:INK c,7:INK d,24 INK e,6:INK v,0:INK g,26 INK h,11
490 FOR q=1 TO w:NEXT
500 INK a,0:INK b,7:INK c,24:INK d,20:INK e,11:INK v,6:INK g,0:INK h,26
510 FOR q=1 TO w:NEXT
520 INK a,7:INK b,24:INK c,20:INK d,0:INK e,26:INK v,11:INK g,6:INK h,0
530 FOR q=1 TO w:NEXT:GOTO 460
540 SNV 1,3,-2,85
550 ENT 1,5,-1,51
560 SOUND 1,150,5,11,1,1,5
570 RETURN

```

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It is quite simple to operate. When the code of the character to be defined is input, the character size must be entered. CSize ?0. This can be in the range nought to three.

This is necessary because the QL uses a different range of pixels in each character row, depending on the pre-set character size. For instance, character size one gives the maximum 8 pixels across, and character size three gives 5 pixels.

When these graphics are used in your own programs, you must use the CSize command with the character size (which you entered when defining the character)

as its first argument, eg, CSize 1,0 or CSize 1,1. Failure to do this may cause odd things to happen. After this, the user can experiment with the character definition on the blow-up grid.

Commands

Space-bar: light pixel at cursor position

Shift: remove pixel at cursor position

C: clear grid

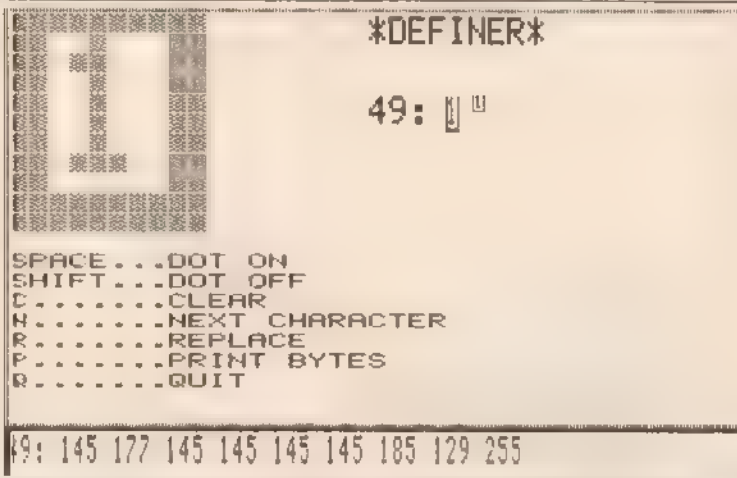
N: next character definition

R: replace old character definition

P: print out definition bytes

Q: leave program

If space has already been reserved on the QL (Respr100)... etc), I recommend the QL is reset before running Definer.



```
1 Remark : QL Graphics Definer
2 Remark : by Richard Snowdon (*SnowSoft*)
100 WINDOW #1,450,210,33,6:PAPER 0
110 WINDOW #0,450,40,33,216:PAPER #2,0
120 MODE 4:SCALE 256,0,0:BORDER
2,175:BORDER #0,2,2
130 moveset
140 ask
150 initiate
160 setup
170 display
180 newset
190 start
200 STOP
210 Define PROCEDURE initiate
220 CSize 2,0
230 DIM pix(9,8)
240 FOR f=1 TO 9
250 FOR e=1 TO 8
260 pix(f,e-(size>1))=(PEEK(charbase+f)
&&(2^(8-e)))<0)*32
270 NEXT e:NEXT f
280 x=1:y=1
290 END Define
300 Define PROCEDURE display
310 FOR f=1 TO 9
320 FOR e=1 TO across
330 AT f,e:PRINT CHR$(pix(f,e))
340 NEXT e:NEXT f
```

```
350 END Define
360 Define PROCEDURE start
370 Repeat mainloop
380 k=KEYROW(1)
390 AT y,x:PRINT CHR$(pix(y,x))
400 IF KEYROW(6)&&8 THEN CSize size,1:STOP
410 IF KEYROW(2)&&8 THEN
420 FOR f=1 TO 9:FOR e=1 TO 8:pix(f,e)=32:
NEXT e:POKE charbase+f,0:NEXT f:display
430 END IF
440 IF k&&2 AND x>1 THEN x=x-1
450 IF KEYROW(5)&&16 THEN
460 FOR replace=1 TO 9:POKE charbase+
replace,PEEK(charbase+10*(a-32)*9+replace):N
EXT replace:initiate:display
470 END IF
480 IF k&&16 AND x<across THEN x=x+1
490 IF k&&4 AND y>1 THEN y=y-1
500 IF k&&128 AND y<9 THEN y=y+1
510 IF KEYROW(7)&&1 AND pix(y,x)=0 THEN
pix(y,x)=32:POKE charbase+y,(PEEK(charba
se+y))^2^(8-x-(size>1))
520 AT 4,22:CSize size,1:PRINT CHR$(a):' '
:CSize size,0:PRINT CHR$(a):CSize 2,0
530 IF k&&64 AND pix(y,x)=32 THEN pix(y,x)
=0:POKE charbase+y,(PEEK(charbase+y))
(2^(8-x-(size>1)))
```

Continued over the page



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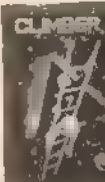
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Fatal mistake

A simple error recovery for the CBM 64
by Simon Wallace

One of the most frustrating occurrences is for a program to crash due to program error. Very often, this error will be due to silly input by the user, and it may not even be possible to guard against such an event from within the Basic program. The only answer is to design programs to recover from error, even where you do not believe that an error could occur!

Many languages and machines have automatic facilities to assist in recovery, but the Commodore 64 does not. The routine shown in this article will enable control to be restored to the program automatically in the event of an error.

The first step is to establish a point in the program which is suitable to *Goto* in order to recover. When a program is started with *Goto* rather than *Run*, the variables are not reinitialised, and the program will restart in the same state as when it was broken. Thus, nothing is lost provided that the program has been designed to restart.

The program must not attempt to define arrays with the *Dim* statement or functions with *Def Fn* as this has already been done once. Files can not be opened a second time, nor can *Data* be Read a second time, unless *Restore* is used.

As you will be unable to predict where the error will occur, it is very difficult to make assumptions. If files may or may not be open, always close, then re-open them in the error routine, as this will not cause an error. Never re-enter in the middle of a subroutine or *For-Next* loop. These procedures can be restarted safely, but can not be exited from unless they have been entered at the very beginning. If tape or disc files are being processed, then a specialised data-recovery routine may be needed.

If you set up an error-handling routine according to the above rules, you will be able to restart the program manually by typing *Goto xxx* where *xxx* is the line number of your routine. This in itself can be invaluable. Consider working with the word processor for an hour (as I am at the moment) and not daring to make a mistake lest all your typing be lost! My word processor has just such an error-recovery routine at line 999 - an easy number to remember. (See *PCW* Vol 3, Nos 26, 27 for listing of word processor.)

The machine-code routine automates the process of typing *Goto 999* when an error has occurred. This may sound trivial, but it is far easier to include the routine in the program, than to attempt to explain how and when to recover.

It works as follows: When the error-message routine of the Commodore 64 is entered via the vector at 768-769, control is

directed to the new routine which inserts *Goto 999* into the keyboard buffer. As soon as Basic is ready to accept your next command, the message is processed as if it had been typed on the keyboard. In addition to this, the error message number is copied into the unused byte at location 2. The recovery routine in your program can then access this number if so desired. The meanings of the error numbers are given in the table below.

The routine is located at 679 which should be unused. If this is not convenient, change the value of *J* in line 20 to the start address you prefer. If you would rather use a line number other than 999, change the 57 in lines 74, 75 and 76 to the ASCII codes for the 3-digit line number required (see Appendix F in the User Manual). If you wish the error message to be suppressed, include line 89 as, 89 *Data* 162-128. To reset the vector for

normal error handling, *Poke* 768,139: *Poke* 769,237.

The example program demonstrates how the error-handling routine works. When the program is run, enter any positive number. There will be no abnormal effect as the arithmetic is valid. If zero is entered, a program error is generated as division by zero is illegal.

The program uses the routine to recover by passing control to line 999. The error message number is found with *Peak*(2), and then printed. Provided it is 20 as expected, control is returned to the main loop. Try changing line 118 so that it generates a different error, such as a syntax error, and see what effect it has.

Clearly, any professional-quality program should include an error-recovery routine such as this. However, even the most basic Basic will be more satisfying if it keeps going to the correct end. Additionally, error-proofing such as this can be used in conjunction with break-proofing (see *PCW* Vol 3, No 13) to ensure that a program terminates as intended without the user being able to interrupt execution, whether by accident or design.

Error message table

Byte 2	Message
1	TOO MANY FILES
2	FILE OPEN
3	FILE NOT OPEN
4	FILE NOT FOUND
5	DEVICE NOT PRESENT
6	NOT INPUT FILE
7	NOT OUTPUT FILE
8	MISSING FILE NAME
9	ILLEGAL DEVICE NUMBER
10	NEXT WITHOUT FOR
11	SYNTAX
12	RETURN WITHOUT GOSUB
13	OUT OF DATA
14	ILLEGAL QUANTITY
15	OVERFLOW
16	OUT OF MEMORY
17	UNDEF'D STATEMENT
18	BAD SUBSCRIPT
19	REDIM'D ARRAY
20	DIVISION BY ZERO
21	ILLEGAL DIRECT
22	TYPE MISMATCH
23	STRING TOO LONG
24	FILE DATA
25	FORMULA TOO COMPLEX
26	CAN'T CONTINUE
27	UNDEF'D FUNCTION
28	VERIFY
29	LOAD
30	BREAK

Continued over the page

Commodore 64

■ REM PROGRAM TO DEMONSTRATE ERROR RECOVERY

```

5 REM
10 REM FOLLOWING CODE
   SETS UP RECOVERY
15 REM
20 J=679 : JA=J
30 READ I : IF I<0 THEN 45
40 POKE J,I : J=J+1 : GOTO 30
45 I=INT (JA/256)
46 J=JA-I*256
50 POKE 768,J : POKE 769,I
60 DATA 134,2
70 DATA 224,128,240,34
72 DATA 169,71,141,119,2
73 DATA 169,111,141,120,2
74 DATA 169,57,141,121,2
75 DATA 169,57,141,122,2
76 DATA 169,57,141,123,2
80 DATA 169,13,141,124,2
85 DATA 169,6,133,198
86 REM
87 REM NEXT LINE IF USED SUPPRESSES
88 REM THE ERROR MESSAGE
89 REM... 89 DATA 162,128
90 DATA 76,139,227,-1
  
```

```

99 REM
100 REM EXAMFLE PROGRAM STARTS
101 REM
105 PRINT "ENTER ZERO TO
   CRASH PROGRAM"
106 PRINT "OR NEGATIVE
   NUMBER TO STOP"
110 INPUT D : IF D<0 THEN END
115 E=1/D
120 GOTO 105
900 REM
905 REM ON ERROR -
   JUMPS TO LABEL 999
910 REM AS IF YOU
   TYPED 'GOTO 999'
915 REM
920 REM ERROR NUMBER
   IS STORED IN LOC 2
925 REM
999 PRINT "ERROR ROUTINE ENTERED"
1000 ER=PEEK(2)
1010 PRINT "ERROR NUMBER IS";ER
1020 IF ER=20 THEN 105
1030 PRINT "THIS REALLY
   IS AN UNEXPECTED ERROR"
1040 STOP
  
```

BYTE

COMMODORE 64

DATA

134,2

224,128,240,34

169,71,141,119,2

169,111,141,120,2

169,57,141,121,2

169,57,141,122,2

169,57,141,123,2

169,13,141,124,2

169,6,133,198

162,128

76,139,227,-1

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POPULAR COMPUTING WEEKLY

Time is on your side

Andrew Haptonstall shows you how to teach children the time (without resorting to Playschool) on the BBC B

This program was designed to help children learn to tell the time. To make this process easier, it has three levels of difficulty. Level one tests hours only, level two includes quarter and half-past the hour, and level three goes on to explore the mysteries of five minute intervals.

I would suggest that an adult is present when the program is first run, to show the child how to enter his or her answer. Possible answers are presented in a multiple choice format and either answer one, two or three is chosen. This method of presentation was used to prevent spelling mistakes causing problems.

The program should work on a Model A if the Colour and Gcol statements are missed out, and the Mode 1 statements are changed to Mode 4.

Program notes

Procinit: Calls procedures to set up the program.
Procarray: Fills the array which contains the times.
Procname: Asks you to type in your name.
Proclevel: Choose the level.
Procrandtimes: Selects random times depending on the level.

Procmain: Calls the other procedures.
Proccolour: Redefines the colours.
Proclock: Draws the clock.
Prochands: Draws the hands on the clock.
Prochoose: Chooses times for the other options.
Proctime: Divides the time by 3.
Procpint: Prints the time in a random order on the screen.
Procanwer: Waits for an answer.
Proctick: Draws a tick if the answer is correct.
Procross: Draws a cross if the answer is wrong.
Procpause: Pauses for a set amount of time.
Prx: Provides a x co-ordinate for drawing the clock.
Prny: Provides a y co-ordinate for drawing the clock.
Prnhour: Selects a random hour.
Prmin: Selects a random minute, depending on the level. (This function is not called if the level selected is one).

```
10 REM ## The Time Tutor ##
20 REM ## Andrew B. Haptonstall ##
30 REM ## August 4th. 1984 ##
40 ONERROR GOTO 40
50 $KEY10 OLD:MRUNIM
60 MODE 7
70 CLEAR
80 forever=FALSE
90 PROCinit
100 PROClevel
110 REPEAT
120 PROCrandtimes
130 MODE1
140 PROCmain
150 IF NOT correct THEN MODE1:PROCmain
160 UNTIL forever
170 DEF PROCinit
180 PROCarray
190 PROCname
200 ENDPROC
210 DEF PROCarray
220 ENVELOPE 1,2,0,0,0,1,1,1,124,
-2,-2,-2,124,100
230 DIM A$(12)
240 FOR AX=1 TO 12
250 READ A$(AX)
260 NEXT AX
270 ENDPROC
280 DATA 5 past,10 past,quarter past,20
past,25 past,half past,25 to,20 to,qua
rter to,10 to,5 to," o'clock"
290 DEF PROCname
300 CLS
310 FOR AX=0 TO 1
320 PRINTCHR$141;CHR$131;SPC(6);
"The Time Tutor"
330 NEXT AX
340 PRINTCHR$129;"You must now
type in your name."
350 PRINTCHR$129;"(And then press RETURN)"
360 PRINT ""
370 INPUT "What is your name",N$
380 ENDPROC
390 DEFPROClevel
400 CLS
410 FOR AX=0 TO 1
420 PRINTCHR$141;CHR$131;SPC(6);
```

```
"The Time Tutor"
430 NEXT AX
440 PRINT"CHR$129;SPC(2);
What level do you want?"
450 PRINTCHR$130;SPC(1);"Level
1: Hours only"
460 PRINTCHR$130;SPC(1);"Level 2:
Half and quarter past"
470 PRINTCHR$130;SPC(1);"Level 3:
Any five minutes"
480 PRINT"CHR$134;CHR$136;SPC(4);
Press 1,2 or 3"
490 $FX21,0
500 REPEAT
510 LET B$=GET$
520 UNTIL B$="1" OR B$="2" OR B$="3"
530 IF B$="1" THEN LET MX=60 ELSE MX=FALSE
540 IF B$="2" THEN LET DX=4;EX=15
550 IF B$="3" THEN LET DX=12;EX=5
560 ENDPROC
570 DEF PROCrandtimes
580 IF MX<>60 THEN LET MX=FNmin(DX,EX)
590 LET HX=FNhour(12)
600 ENDPROC
610 DEF PROCmain
620 VDU 23;8202;0;0;0;
630 PROCcolour
640 PROCclock
650 PROCchands
660 PROCchoose
670 PROCanswer
680 ENDPROC
690 DEF PROCcolour
700 VDU 19,1,6,0,0,0
710 VDU 19,2,2,0,0,0
720 VDU 19,0,4,0,0,0
730 ENDPROC
740 DEF PROCclock
750 PRINTTAB(15,0);"Time Tutor"
760 LOCAL var1X,var2X,var3X
770 MOVE 450,900
780 FOR VZ=0 TO 366 STEP 12
790 LET XX=8*IN(RAD(VZ));8400+450
800 LET YZ=COS(RAD(VZ));8400+500
810 DRAW XX,YZ
820 NEXT VZ
830 VDU 5
```

Continued over the page

```

840 FOR AX=1 TO 12
850 LET X=FNx(AZ)
860 LET Y=FNy(AZ)
870 MOVE X+450,Y+500
880 DRAW (X*8.9)+450,(Y*8.9)+500
890 MOVE (X*1.1)+150,(Y*1.1)+500
900 PRINT AX;
910 NEXT AX
920 VDU 4
930 ENDPROC
940 DEF PROCchands
950 BCOL 0,1
960 LOCAL V1%,V2%,V3%,V4%
970 LET X=FNx(HZ/5)
980 LET Y=FNy(HZ/5)
990 IF (HX>35 AND HX<55) OR (HX>5 AND HX<25)
THEN LET V1%=450;V2%=450;V3%=470;V4%=530
ELSE LET V1%=480;V2%=420;V3%=500;V4%=500
1000 MOVE V1%,V3%
1010 MOVE V2%,V4%
1020 PLOT 85,X+450,Y+500
1030 BCOL 0,2
1040 LET X=FNx(HX)
1050 LET Y=FNy(HX)
1060 IF (HX>7 AND HX<11) OR (HX>1 AND HX<5)
THEN LET V1%=450;V2%=450;V3%=470;V4%=530
ELSE LET V1%=480;V2%=420;V3%=500;V4%=500
1070 MOVE V1%,V3%
1080 MOVE V2%,V4%
1090 PLOT 85,(X*8.6)+450,(Y*8.6)+500
1100 ENDPROC
1110 DEF PROCchoose
1120 LET TX=0
1130 LOCAL V1%,V2%,V3%,V4%
1140 IF HX=60 THEN LET V1%=60;
V3%=60;PROCchimes;B0TD1170
1150 LET V1%=FMin(DX,EX)
1160 LET V3%=FMin(DX,EX)
1170 REPEAT
1180 LET V2%=FMin(12)
1190 LET V4%=FMin(12)
1200 UNTIL HX<>V2% AND HX<>V4% AND V2X<>V4X
1210 PROCtime(HX)
1220 LET HX=TX
1230 LET H0=A0(TX)
1240 PROCtime(V1X)
1250 LET V1X=TX
1260 LET V10=A0(TX)
1270 PROCtime(V3X)
1280 LET V3X=TX
1290 LET V30=A0(TX)
1300 PROCprint
1310 ENDPROC
1320 DEF PROCchimes
1330 RESTORE 1390
1340 FOR AX=1 TO 8
1350 READ pitch,duration
1360 SOUND 1,1,pitch+48,duration
1370 NEXT AX
1380 ENDPROC
1390 DATA 61,10,33,10,41,10,13,20
1400 DATA 13,10,41,10,49,10,33,10
1410 DEF PROCtime(TIME)
1420 LET TX=TIME/5
1430 ENDPROC
1440 DEF PROCprint
1450 REPEAT
1460 LET V1X=(RND(3)*3)
1470 LET V2X=(RND(3)*3)
1480 LET V3X=(RND(3)*3)
1490 UNTIL V1X<>V2X AND V2X<>V3X
AND V3X<>V1X
1500 COLOUR 2
1510 COLOUR 131
1520 PRINTTAB(26,5);"1.";
TAB(26,8);"2.";TAB(26,11);"3."
1530 COLOUR 1
1540 IF V3X=12 THEN PRINTTAB(28,2+V1X);V4X;
V3% ELSE PRINTTAB(28,2+V1X);V3%;TAB(
32,3+V1X);V4X
1550 IF V1X=12 THEN PRINTTAB(28,2+V2X);V2X;V1%
ELSE PRINTTAB(28,2+V2X);V1%;TAB(3
2,3+V2X);V2X
1560 IF HX=12 THEN PRINTTAB(28,2+V3X);HX;H0
ELSE PRINTTAB(28,2+V3X);H0;TAB(32,3
+V3X);HX
1570 ENDPROC
1580 DEF PROCanswer
1590 LET HZ=HX*5
1600 COLOUR 0
1610 COLOUR 129
1620 LET Y3X=Y3X/3
1630 PRINTTAB(28,18);"Please press"
1640 PRINTTAB(28,19);"1,2 or 3"
1650 PRINTTAB(28,20);"to choose"
1660 PRINTTAB(28,21);"the right"
1670 PRINTTAB(28,22);"answer."
1680 $FX21,0
1690 REPEAT
1700 B0=GET$
1710 UNTIL B0="1" OR B0="2" OR B0="3"
1720 CLS
1730 PRINTTAB(15,1);"Time Tutor"
1740 IF Y3X<>(ABC(B0)-48) THEN B0SUB
1750 ENDPROC
1840 ELSE B0SUB 1760
1760 PRINTTAB(5);"Well done ";N0;"
you choose the"
1770 PRINT" correct answer."
1780 PROCTick
1790 PRINT" Press the ANY KEY
to play again"
1800 $FX21,0
1810 LET B0=GET$
1820 LET correct=TRUE
1830 RETURN
1840 PRINTTAB(8);"Sorry ";N0;"
you choose the"
1850 PRINT" wrong answer."
1860 PROCcross
1870 PRINT" Press ANY KEY to try again"
1880 $FX21,0
1890 LET B0=GET$
1900 LET correct=FALSE
1910 RETURN
1920 DEF PROCTick
1930 BCOL 0,0
1940 MOVE 448,192
1950 DRAW 640,0
1960 DRAW 1024,512
1970 ENDPROC
1980 DEF PROCcross
1990 BCOL 0,0
2000 MOVE 448,576
2010 DRAW 768,64
2020 MOVE 448,64
2030 DRAW 768,576
2040 ENDPROC
2050 DEF PROCpause(PX)
2060 TIME=0
2070 REPEAT
2080 UNTIL TIME>PX
2090 ENDPROC
2100 DEF FNx(x)=SINRAD(x*30)*400
2110 DEF FNy(y)=COSRAD(y*30)*400
2120 DEF FNhour(x)=RND(x)
2130 DEF FNmin(x,y)=RND(x)*y

```


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Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Plotter

on Commodore 64

This program should also work on the unexpanded Vic 20. If you have a 1520 plotter/printer this program allows you to draw and doodle directly onto the paper without having to work out lots of co-ordinates.

You can draw in 8 directions by using the keys mentioned in the program. By keying S you can change the pen colour or the mode, of which there are two. While in mode M your pen will just move about without making any marks but in mode D lines will be drawn.

Directional movement of the pen is given using the main compass points.

Program notes

3-120 Initialise and set screen display.

130-230 Check for key depression and move to appropriate sub-routine.
240-250 Draws or moves to next point.
1000-1020 North-west movement.
2000-2020 North.
3000-3020 North-east.
4000-4020 West.
5000-5020 East.
6000-6020 South-west.
7000-7020 South.
8000-8020 South-east.
9000-10110 Change colour or mode.

Variables

M\$ Mode.
C\$ Colour.
A\$, R\$, B\$ Input variables.
X,Y Co-ordinates of pen.
OS Operation being performed.
H Maximum height of drawing.

```
1 REM "DOODLE" BY SARAH COTTON
2 REM FOR USE ON THE 1520 PLOTTER
  /PRINTER
3 POKE650,255
4 M$="D":C$="BLACK"
10 OPEN1,4,1:OPEN2,4,2:PRINT#2,"0"
40 INPUT"XXXXXXXXXXXXHEIGHT
(50-999)";H
45 IFH<50ORH>999THEN40
50 PRINT#1,"M":0.-H:PRINT#1,"I"
70 PRINT"s"
80 PRINT"Q01COLOUR:";C$
```

```
85 PRINT"Q01MODE:";M$
87 PRINT"Q01OPERATION:";O$
90 PRINT"Q QWE"
100 PRINT"■ 0"
110 PRINT"ZXC"
120 PRINT"Q05-COLOUR/MODE"
130 GETA$
140 IFA$=" "THEN130
150 IFA$="Q"THENGOSUB1000
160 IFA$="W"THENGOSUB2000
170 IFA$="E"THENGOSUB3000
180 IFA$="A"THENGOSUB4000
190 IFA$="D"THENGOSUB5000
```

Arcade Avenue



Freddy's cat

The Jetset Willy postbag is bulging, as usual, with some particularly interesting letters this week. First of all thanks to James Blair of Coleraine and David Whittall of Birmingham for your letters but the Pokes are a bit too familiar to publish again. Stephen Cargill of Southport has sent in the following small program for owners of Interface 1 which stops the crash when the pause key is pressed. To be loaded at 8B1F hex or 35615 decimal.

Hex	Assembly
21 E2 65	LD HL, 85E2
01 FE BF	LD BC, BFBE
ED 78	IN, A, (C)
2F	CPL

E6 IF AND IF
The problem occurs because port 0 is read when the key is pressed. The new program provides an improved method of testing the keyboard. To load it type Merge (Enter) — load the basic then type Clear 32767:Load Code (Enter). Then enter the hex and type Save "Jetset" Line 1:Save "jsw" Code 32768, 32768 (Enter). For those of you with no hex loader I have converted Stephen's hex — Poke 35615 to 35625:33, 226, 133, 1, 254, 191, 237, 120, 47, 230, 31.

Along similar lines, Graeme Carrot of Gosforth has sent in poke 36635,239 for owners of Interface 2. He also gives us the following — Poke 36477, 1 makes Willy immune when falling, Poke 38240, 0 kills off Maria, Poke 36358, 0 turns you into zebedee to go bouncing around the mansion (though you end up in the off licence or stuck in the sand of the beach), Poke 36545, 0 makes

the Banyan Tree easier, Poke 34795, 47 makes you start in an empty room above the conservatory roof and Poke 41063, 255 allows the finishing routine to be seen with only one object collected.

In his fascinating letter he goes on "to clear up the mystery of the names used — Nomen Luni is a nicky take of Imagine's Zoom logo, and a 'Quirkallee' is a strange chant expressed while lying on your back like a dead dog in the presence of dead furry animals (see 'The Adventures of Fat Freddy's Cat No. 5').

Graeme finishes: "I eagerly await the CBM 64 version with four extra rooms, and more from the Manheew Smith stable — but please add an 'Attic' feature — it's so much fun trying to get round it!" However, I should point out I have had some letters from very angry people who do not agree with him. One signed "A frustrated JSW player" was very bitter

indeed about the fact that the game could not be completed "honestly" and that since you had to Poke around to finish the game there is no proof that the winners "moved miner Willy one inch".

Finally for this week a letter and tape from Chris Jenkins and Paul Rhodes of 104 Vennor Gardens, Luton, Beds, LU3 3SW who are offering for sale (I don't know how much) a JSW editor — a marvellous utility that allows you to redefine everything including the room layout, the map of the mansion, the position shape and speed of the arrows. **Tomy Kendle**

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments, from playing tips on difficult games or programs you'd particularly like to praise (or blame) then write to: Tomy Kendle, Arcade Avenue, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD

```

200 IFA$="Z" THEN GOSUB 8000
210 IFA$="X" THEN GOSUB 7000
220 IFA$="C" THEN GOSUB 8000
230 IFA$="S" THEN GOSUB 9000
240 IF M$="D" THEN PRINT #1, "J":X,Y
250 IF M$="M" THEN PRINT #1, "R":X,Y
260 GOTO 70
1000 IF X-15<0 OR Y+15>H THEN RETURN
1010 X=X-15:Y=Y+15
1020 O$="NORTH-WEST":RETURN
2000 IF Y+15>H THEN RETURN
2010 Y=Y+15
2020 O$="NORTH":RETURN
3000 IF X+15>400 OR Y+15>H THEN RETURN
3010 X=X+15:Y=Y+15
3020 O$="NORTH-EAST":RETURN
4000 IF X-15<0 THEN RETURN
4010 X=X-15
4020 O$="WEST":RETURN
5000 IF X+15>400 THEN RETURN
5010 X=X+15
5020 O$="EAST":RETURN
6000 IF Y-15<-999 OR X-15<0 THEN RETURN
6010 Y=Y-15:X=X-15
6020 O$="SOUTH-WEST":RETURN
7000 IF Y-15<-999 THEN RETURN
7010 Y=Y-15
7020 O$="SOUTH":RETURN

```

```

8000 IF X+15>400 OR Y-15<-999 THEN RETURN
8010 X=X+15:Y=Y-15:RETURN
9000 PRINT "s"
9010 PRINT "PLEASE INPUT NUMBER"
9020 PRINT "OF REQUIRED OPERATION"
9030 PRINT "0001-DRAW"
9040 PRINT "002-MOVE"
9050 PRINT "003-CHANGE COLOUR"
9060 GET B$:IF B$="" THEN 9060
9070 IF B$="1" THEN M$="O"
9080 IF B$="2" THEN M$="M"
9090 IF B$="3" THEN 10000
9100 RETURN
10000 PRINT "INPUT COLOUR NUMBER:"
10010 PRINT "000-BLACK"
10020 PRINT "001-BLUE"
10030 PRINT "002-GREEN"
10040 PRINT "003-RED"
10050 GET R$:IF R$="" THEN 10050
10060 PRINT #2, VAL(R$)
10070 IF R$="0" THEN C$="BLACK"
10080 IF R$="1" THEN C$="BLUE"
10090 IF R$="2" THEN C$="GREEN"
10100 IF R$="3" THEN C$="RED"
10110 RETURN

```

Plotter
by Sarah Cotton

Microradio

GW6JJN



Cellular radio

Some of you may remember reading the Microradio article on Cellular Radio a few weeks ago and may have some understanding regarding the complexities involved.

If not, you will be like most people in thinking that it is just an extension to the normal radiophone system, but many times better.

The whole concept of Cellular Radio is very new and revolutionary. To have a tele-

phone in a car is not very new, perhaps, but Cellular Radio offers much more than this. Imagine having, wherever you go, a small phone which you can use to speak to anyone both through the cellular system or through the public telephone system. Of course, the whole thing is handled by computers and you don't need to know what a cell is just to Dial-a-disc.

You don't need to know that as you move from cell to cell, the frequency of your transmission changes automatically within two milliseconds and automatic digital systems track your every move... all very futuristic.

Two companies have recently been licensed by the government to introduce this incredible system over the next few months. The first is Telecom Securicor Cellular Radio which will operate a system called Cellnet. Telecom Securicor is composed rather obviously of

British Telecom who owns 51% and Securicor who owns the other 49% of the firm.

The second company to get a licence is Racal. Not a household word, at least not until they started advertising on television recently just so that everyone will know who they are when the cut-throat competition begins in earnest.

So what is on offer from these firms? Telephone calls from anywhere to anywhere, any time, any place is one thing. Another is the ability to send data at 600 bits per second so anyone can talk to a computer. What this means in practice is that you could set out on a car journey, tell the computer where you are going and the computer will work out the best route knowing of courses where the snarl-ups are.

Racal say this could save the country nearly two thousand million pounds a year which is what they estimate is wasted on fuel and road accidents, etc.

The whole idea of computer communications on the move is taking off in a big way. Under the government's programme of research into this very subject are big names like Racal, Cambridge University and several other universities, Acorn Computers, BL Technology (of talking Maestro fame), Shell and BP and not least, the RAC who sees the potential for its members.

It all sounds very expensive, but both Telecom Securicor and Racal deny this. The system already costs less than the current radiophone and the price is falling by the hour.

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share, or topics that you would like to see covered, write to: Ray Berry, Microradio, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

Moving Graphics

on BBC

This program shows how VDU 19 can be

used to make things move. The computer first draws an oval, then horizontal and vertical lines over it. When the lines are completed they will start to move, changing direction and colour every so often.

Program notes

Lines 10-80	Work out variables
Lines 90-180	Main program
Procove	Draws oval
Procline	Draws horizontal lines
Procline 2	Draws vertical lines
Procmove	Moves lines

```

10 MODE4
20 PRINT "ENTER LINE 12, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849,
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Moving Graphics

by Mark Dixon

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Tony Bridge's Adventure Corner



LOM feature

Last week, I looked at *Lords of Midnight*, and ended up promising help. "Never in reviews of the game have I seen any clues," says Paul Newton of Swindon. He seems to be having a lot of trouble. His letter was quite long, but he has two main problems — first, once Morkin or Fawkin have the Ice Crown, there seems to be no option offered by the program to destroy it. This wouldn't be so bad, as the game may also be won by defeating the armies of Doomdark — but Paul finds that, even with a much larger army, the Free are defeated.

First things first, Paul — as you pointed out, Fawkin the Skulkrin can also destroy the Ice Crown (find him at MoonHenge, which is West of the Forest of Lothar, between the Downs of Miron and the Mountains of Toomog, in the Province of the Moon), and this information can be gained by asking at one of the many Towers of the Wise. You may also find other characters who can destroy it, such as Logrim the Wise (find him up in the top North-East corner of the Map of Midnight, by Lorchenge, on the Plains of Fadralth) and Farflame the Dragonlord, who is very weak. You'll find this character at the Tower of Coroth.

However, it seems, from what I have been told, that you need to get at least one friend to go with Morkin (although Gregg Reid of Dundee reckons that you need all four); although there is a clue about a certain lake that will also destroy the Ice Crown, so if

Morkin is alone, he may still be able to destroy the Ice Crown by finding the Lake.

As for the strategic problems, I'm reliably informed (by Keir Thorpe from Weybridge, among others), that you must keep Luxor away from Citadels and your main armies — he is the one that the Foul can detect, and they want his blood! Keep him on the move for this reason.

The strategic game must be embarked upon as well the adventure quest, as the armies that you gradually recruit will act as a diversion for the Foul forces, keeping them, you hope, away from Morkin and his companions. If the quest for the Ice Crown proves a failure, then you should still be in a position to press on with a military build-up.

Several other hints have been passed on to me — Farflame, for instance can be very useful, because, as well as being immune from the Ice Fear (or maybe because of this), he can travel much faster than the other characters, who seem to be limited to about eight moves per day. Beware Snowhalls and Kenges — there you will find the Hand of Dark, which "brings death to the day" for the finder. Don't rely too heavily on finding lakes to refresh your characters; although your forces will be "utterly invigorated" after drinking at a lake, it is a day or two before it can be used again.

Don't rely too much, either, on the Lord of Brith — "You'll find", says Keir, "that he may well become utterly afraid at the most unfortunate times, just before a battle and so on. I have also discovered a possible bug — when some of the characters, particularly Rorthron and Luxor, move to some locations (Laths, for example), night falls, although when you Look again, it is still day for them. Also, can someone please tell me why Morkin cannot recruit anyone South of Coroth?" Keir has also found some locations not marked on the map — for example, the Citadel of Dawn due South of Marakith, held by the Free, and the Citadel of Gorgnath on the Plains of Walethor, held by the Foul.

One thing that would seem to be worthwhile doing, is to make a detailed plan of your actions, thus keeping a check on the movements of all the forces at your command — and those of Doomdark, if possible. There are so many that you cannot possibly hope to remember where everyone is.

As Dave Wagner, of Acton in London, says: "Despite being not, in any way, a wargame enthusiast, I find it totally enthralling. I have never felt so involved before, and can scarcely wait for my adventuring partner to get back from holiday so we can really get going — controlling and correlating the efforts of so many characters is very hard work and much better shared, I'm sure. I really think this is the best adventure yet."

Some final tips from Steven Stoner, who writes from Southampton. He succeeded in classic fashion, that is, with a two-forked prong — a build-up of forces in the south, to take attention away from Morkin in the north. He says, "When travelling, baddies such as ice trolls and wolves are best steered around, as trying to kill lots of these can cause careless loss of life. Avoid taking armies through mountain ranges, which exhausts the troops and renders them useless for battle. Before battle, always Think to find out if you are outnumbered, and by how much. If the odds look favourable, go for it (bearing in mind earlier comments about Luxor's presence — TB). Seek at every village, lath and so on, as it usually proves worthwhile. At the very beginning, try to find the Lord of Shadows, hidden somewhere in the Forest of Shadows, surrounding the tower of the Moon."

Steven finishes by hoping that *Doomdark's Revenge*, the first sequel to *Midnight* will not be too long in appearing — I don't think you're alone there, Steven!

All in all, it seems that, if you plug away at *Lord of Midnight*, success should not be far behind. So many ways of winning present themselves, however, that the game will take a long while to get stale.

Congratulations to all those lucky people who have finished the game — Gregg Reid puts it all down to his reliance on that greatest of all philosophies, "Life is but a cheese pizza".

To finish off, Gregg has a complaint about Beyond Software. "Once I'd completed the game, I phoned the Beyond Hot-Line, tried in vain for a week, and also sent a letter with SSAE. No answer from the phone or the letter." Come on, Beyond, if you're going to hold a competition, you could at least let everyone know how they've done. Many people have bought your game and you should expect to have quite a number of letters about it — don't spoil what is one of the classic games of all time, for any micro!

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further, write to: Tony Bridge, Adventure Corner, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

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CRASH MICRO SEPT '84.

4 Whichever machine you own, if you have the vaguest tendency towards adventure playing then you must try one of these games (unfortunately you'll probably end up wanting to buy the lot!)
Computing Today, August 84

4 To me, all Level 9 adventures create a remarkable atmosphere because the descriptions sound so life-like. This is where so many other adventures fail.
Crash, July 84

4 But it's not just the size of the game it's the quality as well that is astonishing... scenes to fire the imagination.
PCG, April 84

4 As in all Level 9's adventures, the real pleasure comes not from scoring points but in exploring the world in which the game is set and learning about its denizens.
Which Micro?, February 84

4 (LORDS OF TIME). As we have come to expect from Level 9, the program is executed with wonderful style... Highly recommended.
PCW, 1 February 84

4 I thoroughly recommend these Adventures, they are excellent value for money. No self-respecting Adventure-addict should be without them. I believe Level 9 are producing a series of Adventures which should be regarded as classics.
Atari User, July 84

4 These programs run very fast and there are no frustrating pauses. Level 9 Adventures are superbly designed and programmed, the contents first rate. The implementation of Colossal Adventure is nothing short of brilliance; rush out and buy it. While you're at it, buy their others too. Simply smashing!
Your 64, June 84

4 Level 9 - arguably the producer of the best adventure games in the UK - has done it again. LORDS OF TIME is a sparkling addition to its stable of winners.
Acorn User, July 84

4 (SNOWBALL). This is another imaginative, massive-scaled immensely enjoyable adventure from those experts down at Level 9 Computing.
Your Computer, March 84

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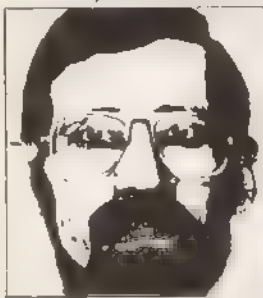
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Immediate run

■ Anderson of Edgware, Middlesex, writes:

Q Having recently purchased a 48K Spectrum computer, I notice that most of the commercially produced software starts to run as soon as loading is completed, without the need for Run/Enter. I enjoy writing simple Basic programs and would like to be able to do the same. Can you please advise me on a routine to effect this immediate Run?

A You don't actually need a routine to make a Basic program 'auto-run', the secret lies in the Save command used. If you had a program called Fred that you wished to auto-run, then you would need to Save it using a statement, thus -

Save "Fred" Line.
Thus would cause the program to Run, starting at the first line, immediately on loading. If you wanted the program to start at a line number other than the first one in the program (say Line 300) then the Save statement would be - ; Save "Fred" Line 300.

Sales figures

Gerald Jess of Kings Lynn, Norfolk, writes:

Q I am trying to write a program to input sales figures and then print them out under customer, date, etc. What I want to do is dimension the number needed, initialise them and then look for the first empty string so as to put the latest figures in here. Using a Spectrum, I tried Dim d\$(10):For n=1 To 10:Let d\$(n)="":Next N:For n=1 To

10:If d\$(n)="" Then Let d\$(n)="date".

This doesn't work, why not?

A The Dim statement on the Spectrum, when used with character arrays, needs two parameters.

The first one specifies how many dimensions (occurrences) there are, and the second specifies the number of characters occupied by every occurrence.

Thus, in your case you have defined an array (d\$) of 10 occurrences each of 1 character (the default) in length.

The reason that your initialisation routine does not work is that it depends on having a zero length occurrence (this is not possible on the Spectrum).

Normal string variables do not have a length defined for them, and they can therefore grow and shrink according to the needs of your program. Arrays, however must have a length associated with them, and that length never changes (no matter what the contents).

Right and left

J R Thompson of Warrington, writes:

Q Because the Spectrum doesn't have a Right\$ facility, I am having problems with one line of a program that I am copying from another computer's listing. Could you please explain how Right\$ works on the Spectrum, as I can't even grasp what is written in the manual about it?

The statement I am trying to convert is `x=10*(Asc(A$-64)/Val(Right$(A$ 1))`

A As you quite rightly point out, the Spectrum does not have a Right\$ (or Left\$) facility. You will need to make use of the To operator. This allows you to specify a 'slice' of a string to be worked on, eg. Let `A$=B$(4 TO 5)` puts characters 4 and 5 of B\$ into A\$.

To simulate Right\$ you need to code the appropriate To clause, eg Let `A$=Right$(B$,3)` - takes the last three characters of B\$ and puts them in A\$. This is written as: Let `A$=B$(Len B$-3 TO Len B$)`. To produce the effect of Left\$, you write Let

`A$=B$(TO 5)` - this takes the first five characters of B\$.

The statement you wish to convert could therefore be written as: Let `x=10*(Asc(A$)-64)/Val(A$)-1 TO Len A$`.

Aerial signals

Stephen Coupland of Thanet, Kent, writes:

Q I would like to know how I can make an Aquarius and a black and white television send signals from an ordinary aerial. I would also like to know if I can do this without a modem or acoustic coupler?

A In order to send (or receive) signals from a computer, you need a modem. Either the direct connection, or acoustic coupler type will do for the purpose. The computer will also need an RS 232 interface. I don't know of any one who markets such an interface for the Aquarius I'm afraid. Until one appears, you will not be able to use your machine to communicate with others.

Program converter

C Billingham of Birmingham, writes:

Q I have an Epson HX20, and my problem concerns converting programs for other computers to run on my computer. On some of the programs the Poke statement is used for such things as Poking the computer's clock, or setting the screen.

Could you please tell me if there is some way of getting these addresses? Is there a command statement that will return these addresses using a Print Chr\$ statement or something like that?

A Trying to convert programs which include

Poke (or Peek) statements is a very tricky business. As well as having to understand exactly what the purpose of each of these statements is, you need to know what the equivalent one is on the Epson (if indeed there is one).

However, if we assume that you are able to determine the function of particular Poke statements, then you will need to know exactly where the important addresses are in your machines memory.

I am afraid that the computer will not be able to tell you what these addresses are, so you will have to discover them yourself. A good source of information would be the Complete Technical Manual for the HX20 which is obtainable from your Epson dealer priced at £27.

Royalty payments

T C Whalley of Peterborough, writes:

Q In the advertisement for White Lightning, it makes the point that we can market games without paying royalties. Does that mean that if another system is used (such as The Quill) we have to pay royalties to the software house supplying the games generator?

A As far as The Quill is concerned Gilsoft who market it only ask that an acknowledgement is made on any game produced, mentioning The Quill. No royalties are then payable. Most other games generators however do not state this, implying that any software produced would be liable to royalty claims.

Your question actually raises an important question in terms of copyright. If you use a compiler to produce a faster version of a Basic program, are you liable to have to pay royalties to the compiler supplier? In the world of commercial data processing, the answer is no.

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FRIDEN Fellower, electric typewriter, Printer and tape punch. No. ASC II Code but convertible heavy, buyer collects £10. Tel: 021-429 9171

BROTHER EP44 Thermal Printer. Typewriter, letter quality with RS232 interface unused £230 or sweep for Epson or other matrix printer. V. good condition Tel: 021 429 9171

TI-99 PLUS Extended basic, parsec tombolove city, cassette leads, TV basic o.n.o. White 92a The Avenue, Ramsey Cambs or phone Ramsey 813877 after 6 p.m.

VISION'S Snooker for the Acorn Electron for sale only £6.95 Tel: (0223) 832164

JETSET WILLY C3.50 Hunter Kukul £5.50 Tel: Eardisley (05446) 202 After 7pm

CRAZY CAVE MEN, Evros Ascend for sale 1st £148 8178

LYNX 48K Boxed as new plus software including assembler, disassembler, extended basic, scrolling screen program and many more code and basic games £135 Tel: Stirling (0786) 841731

ORIC MCP 40 unused and boxed £100 ono or swap for Dragon soft or hardware. Ring After 5.30, Stanley, County Durham 39431

ORBIS Home Computer Course complete parts in Binders £18 o.n.o. after 7 p.m. 021 772 6891

ORIC 1 48K, leads, manual P.S.U. cassettes. £50 Tel: 0895 832147

BASIC MATTE Intellivision System Cartridges Best Offer Tel: 0895 832147

CLATT-SERIES No doubt, £380, ono, 2 months old. Purellie interface £40. 1 month old. Tel: Tony 578 1704 after 7pm

ZX PRINTER 8 rolls of paper £34. 0302 722669 Nick

SEKISHA GP100A, Graphics Printer with Rampton interface + paper for use with Spectrum £230 Tel: (0632) 501521 eves

COLECOVISION + steering wheel + 5 games £100 Intellivision + voice + 10 games £100. Tel: 01-267 0055

ALPHACOM 32 printer -- 4 months old + 1 roll of paper. Spectrum Compatible will deliver within a reasonable radius £43.00 Tel: Shrewsbury 59356

ZX MICRODRIVE, Interface 1, 5 cartridges + ZX printer £100 ono Tel: 01-874 4221

SHARP MZ 80A 48k ansicor monitor + cassette, 11 utilities, 8 games, 8 tape starter pack, manual + books £350 ono. Tel: 0903 690370 eve + weekends

14 IN COLOUR monitor Microvitch £150. Tel: 881-3501

MACHINE LANGUAGE monitor cartridge (VIC-20) brand new -- unwanted gift, best offer secures. Tel: 01-366 7115

THREEBOOKS, under guarantee. One 1.5 w games, all leads, very good condition £100 ono. Tel: 4965 Cannock Beds.

SENSORY 9 chess computer. Cost £185 open to offers. Tel: 0302 49475

ATAFI soft, Donkey King, Robtron, Miss Pac Man, Pole position for CBM 64 will pay up to £13 each for originals. - Tel: Wraybury 2518 after 7pm

ADVENTURE HELPLINE

Hobbit on Commodore 64. How do you escape with the treasure from the dragon without being burnt to a crisp? George Macellaro, Dental Centre, Roberts Bk, Osnabrück, RFPO 36.

Voodoo Castle on Vic20. I have got so far as circling the coffin to wake up the Count, but I am unable to find the doll to finally complete the adventure. Any hints would be greatly appreciated. David Shpherdson, 3 Tarn Villas, Cowpasture Road, Ilkley, W Yorks.

Hobbit on Spectrum. How do you get across the dark river, get past the bulbous eyes and get down the trapdoor? Paul Milne, 52 Exeter Street, Gateshead, Tyne and Wear.

Hobbit on Spectrum. What is the right way in the dry cave as to get out of the goblins' dungeon? I cannot get my Hobbit to go through the window? I Fitton, 390 Eastern Avenue, Dogthorpe, Peterborough.

Knight's Quest on Spectrum. I cannot get out of the deserted wasteland. I have with me a horse, compass, rope and book. A Blunnie, 11 Rockwood Avenue, Loughton, Essex.

Pharaoh's Tomb on Spectrum. How do I get past the magic panel? Debbie Barbé, Vista du Cuet, Colmarod, Castel, Guernsey, Channel Islands.

Madman and the Minotaur. I have got Vetur but I can't seem to be able to do anything else. S Power, 22 Church Close, Pool in Warfield, nr Leeds, W Yorks LS21 1CN.

Voodoo Castle on Vic20. How do I get at the raven crying outside the window? Also, how do I get past the laboratory without being killed? Alexander Steeloe, 32 Jubilee Street, London E1.

Hobbit on Commodore 64. How do I stop getting caught after escaping from the goblin's dungeon? I have the ring. Anthony Green, 2 Edgfield Close, Whitechapel, Bristol 4.

Valhalla on Spectrum. Could someone please give me directions from Hallgate to Ofnu. Stephen Belmer, 'Crescent', Mill Road, Inver, Larne, Co Antrim, N Ireland.

Castle of Riddles on BBC. I cannot get out of the maze of jet-black passages. Have I simply gone the wrong way? Nigel Reed, 7 Crownfields, Langford Budville, nr Wellington, Somerset.

Hobbit on Spectrum. How do I get Thorn out of the goblin's mountain? I have the ring and I have got out myself. How do you cross Milkwood? J E Foley, 156 Collier Row Road, Collier Row, Romford, Essex.

Velnor's Lair on Spectrum. How do I get past the sharks and enter the passage in the pool? R T Sanderson, 29 Feltree Close, Ford Estate, Birkenhead, Merseyside L43.

Alice-in-Wonderland on Memo-

tech. I am lost in Grimbley Forest. How do I get out? Alan Dobson, Flat 1, 200 Stockport Road, Timperley, Altrincham, Cheshire.

Pirate's Cove on Vic20. How do you get past the crocs in the caves on Pirates' Island? Anthony, 84 Wood Lodge Lane, West Wickham, Kent.

Hobbit on Spectrum. I am too thick to find the answers to the riddles and need advice for later on. Please help! Wayne Fletcher, 48 Airedale Road, Darton, Barnsley, S Yorks.

Hobbit on Commodore 64. How do I get out of the Elvenking's Halls? And how do I reach the window in the goblins' dungeon? Martin D Wileman, 110 Lossiemouth Road, Bishopmill, Elgin, Grampian, Scotland.

Voodoo Castle on Vic20. How do you get through the crack into the wall? A Kingman, 6 Fallowfield, Leighton Buzzard, Beds.

Explosion Island on ZX-1. I can't get past the native woman on the grass plain, even with the lucky beads I've had the game for four months and still can't solve it. Fraser Hay, 8 Grant Street, Cullen, Banffshire, Scotland.

**SEE
INTERNATIONAL
ADVENTURE CLUB
(CLASSIFIED)**

Diary

Event	Date	Venue	Admission	Organisers
XX Fair	Oct 6 10.00am-5.00pm	Polsey Civic Centre Polsey W Totx	75p adults 50p children	Northern Premier Exhibitions 0632 952654
Liverington Computer Fayre	Oct 6-7 10.00am-3.00pm	Peel House Ladyswell Liverpool W Lottian	£1.00 programme	Sec/W Lottian Computer club 0896 39048
Computer Graphics 84 (over 125 only)	Oct 8-10 10.00am-6.00pm Oct 11 10.00am-4.00pm	Wembley Conference Centre	Free in advance £8.00 on door	Online Conferences 01-808 4406
Agricultural and Survey Show North	Oct 10-12 10.00am-4.00pm	New Century Hall New Century House Corporation Street Manchester	Free in advance from organisers	16th Computing Magazine 01-341 2384
Computer Games and Software Retailer Show (trade only)	Oct 17-18 9.00am-5.30pm	Horrell London W6	Free	Macro Exhibitions 0898 490696
Home Computer Education and Games Fair	Oct 20 12.00pm-8.00pm Oct 21 10.00am-6.00pm	Leam College of Higher Education	£1.50 adults £1.00 children	Show and Eubern 0882 29511
Electronics and BBC Micro User Show	Oct 25-27 10.00am-5.00pm Oct 28 10.00am-4.00pm	Alexandra Palace London N22	£2.00 adults £2.00 children	Database Publications 061-489 8392
Home Tech 84	Oct 26-28 10.00am-5.00pm	Bristol Exhibition Centre	£1.50 adults £1.00 children	Mastermind Exhibitions 0878 590465
Computer in Action	Oct 30 10.00am-6.00pm Oct 31 10.00am-8.00pm Nov 1 10.00am-8.00pm	Anderson Centre Glasgow		Trade Exhibitions 041-204 0289
Mycomat (Thames Valley Personal Computer Exhibition)	Nov 1-3 10.00am-6.00pm Nov 4 11.00am-5.00pm	Felton Centre Brough	£2.00 adults £1.00 children	Swan House Special Events 08322 43886

Spectra
 1 (-) Delay Thompson's Decision (Ocean)
 2 (8) Lords of Midnight (Beyond)
 3 (1) Tornado Low Level (Vervec)
 4 (5) Jet Set Willy (Software Projects)
 5 (2) Fighter Pilot (Digital Integration)
 6 (4) Rapacallion (Bug Byte)
 7 (7) March Point (Piston)
 8 (9) Sabre Wolf (Ultimate)
 9 (3) Cavalier (Ocean)
 10 (-) Full Throttle (Microgame) and Son.
 (Figures compiled by W H Smith, London)

2021
 1 (1) Run Run (CRL)
 2 (4) Walk the Plank (Novus)
 3 (3) Krusty Kong (PSS)
 4 (-) Meteor Storm (DIE Tronics)
 5 (3) Planet Raider (Novus)
 6 (-) Meteoroids (DIE Tronics)
 7 (-) Espionage Island (Arie)
 8 (-) Erypon Ordial (Novus)
 9 (-) Flight Simulation (Piston)
 10 (-) Black Crystals (Carroll)

ABC II
 1 (1) Portraits (Pace)
 2 (4) Chooka (Micro Power)
 3 (5) Smash and Grab (Spectrum)
 4 (8) Spindle Command (Spectrum)
 5 (3) Micro Olympics (Spectrum)
 6 (10) Mr Wa (Micro Power)
 7 (8) Fantasy (Acornsoft)
 8 (7) Aviator (Acornsoft)
 9 (2) Wallaby (Spectrum)
 10 (9) Stock Car (Micro Power) and Son.
 (Figures compiled by W H Smith, London)

Dagons
 1 (1) Up Pericopel (Beyond)
 2 (2) Ring of Darkness (Windsord)
 3 (-) Climb on the Moon (Microdeal)
 4 (3) Chicken Egg (A & F)
 5 (-) Elphthal (Microdeal)
 6 (-) Mr Dig (Microdeal)
 7 (9) Space Shuttle Simulation (Microdeal)
 8 (1) Dungeon Raid (Microdeal)
 9 (-) Buzzard Hunt (Microdeal)
 10 (8) Hungry Horace (Melbourne House)

Commodore 64
 1 (1) Scrabble (Lectra Games)
 2 (2) BMX Racers (Mastertronic)
 3 (-) Beachhead (US Gold)
 4 (8) Arabian Knights (Intercept)
 5 (5) Hunchback (Ocean)
 6 (10) Decathlon (Ocean)
 7 (4) Decathlon (Acornsoft)
 8 (-) Gilligan's Gold (Ocean)
 9 (7) Space Walk (Mastertronic)
 10 (10) Encounters (HITech)
 (Figures compiled by Webster/Bookman)

Vic20
 1 (3) New York Blitz (Mastertronic)
 2 (5) Soccer (Visions)
 3 (-) Fight OIS (Crag Communications)
 4 (10) Mover Maria (Voyager)
 5 (7) Sub Hunt (Mastertronic)
 6 (1) Tower of Evil (Thorn EMI)
 7 (4) Phoenix Attack (Mastertronic)
 8 (8) Crazy Kong (Intercept)
 9 (-) Duck Shoot (Mastertronic)
 10 (-) 3D Maze (Mastertronic)

Books
 1 (5) Introducing Commodore 64 Machine-code
 2 (1) Commodore Programmers Reference Guide
 3 (-) Guide to Playing the Hobbit
 4 (2) Machine-code Sprites and Graphics on Spectrum
 5 (6) Practical Spectrum Machine-code
 6 (8) Discover Your Spectrum
 7 (-) Battle Games
 8 (6) 100 Programs for the ABC Micro
 9 (-) Space Games
 10 (-) Computer Programming for Beginners
 (Figures compiled by Webster/Bookman)

Books
 1 (5) Introducing Commodore 64 Machine-code (Granada)
 2 (1) Commodore Programmers Reference Guide (Pitman)
 3 (-) Guide to Playing the Hobbit (Melbourne House)
 4 (2) Machine-code Sprites and Graphics on Spectrum (Santaltra)
 5 (6) Practical Spectrum Machine-code (Santaltra)
 6 (8) Discover Your Spectrum (Century)
 7 (-) Battle Games (Unibourse)
 8 (6) 100 Programs for the ABC Micro (Prestice-Hall)
 9 (-) Space Games (Unibourse)
 10 (-) Computer Programming for Beginners (Toshiba)

BUMPER BOOK

Christmas comes but once a year and around now book companies try various ploys to get your money. One such ploy is the 'bumper' book containing a vast mish-mash of previous material from other books.

Obviously it involves no effort on the part of the publishers beyond commissioning a new cover so usually such books are relatively inexpensive. Provided you examine them carefully to check that you don't already have a lot of the material, these books can be a good idea.

The Complete Commodore 64 is one such book; it contains a large guide to programming in Basic, a lot of games to type in with notes and a large section on peripherals like disc drives and printers. There are appendices on hex/dec conversion, the 6802 instruction set and an, inevitably incomplete, list of software.

Book The Complete Commodore 64
Price £9.95
Micro Commodore 64
Supplier Granada Publishing
 8 Grafton Street
 London W1X 3LA

GOOD START

Step by Step Programming for the Commodore 64 is the first volume in a guide to the use of basic Commodore commands for calculation, sprite design, peek and poke, and so on.

There are numerous screen shots of what your TV should look like, which is more help than a dozen other ways of helping people understand the information.

In fact, even within volume 1 you are introduced to relative complex techniques, designing sprites screen maps and the like, so it's fairly rich in information.

■ the fact that each part of this series is £3.95 doesn't put you off, then this is a pretty good start ■ Commodore programming.

Book Step by Step Programming on the Commodore 64
Price £5.95
Micro Commodore 64
Supplier Dorling Kindersley
 Goldstar
 1-8 Henrietta Street
 London WC2E 8PS

This Week

Program	Type	Micro	Price	Supplier
Star Avengers	Arc	Amstrad	£6.95	Kuma
Outpost	Arc	Alan	£12.95	Quicksilver
Jet Pac	Arc	BBC	£7.95	Ultimate
Lingo	■	BBC	£12.95	Cms
Know your Pal Q	■	BBC	£8.95	Mirrorsoft
Castle of Jeasoom	Ad	Commodore 64	£14.95	Quicksilver
Ah Diddums	Arc	Commodore 64	£5.50	Beau Jolly
Antipal	Arc	Commodore 64	£7.95	Llamesoft
Ant Attack	Arc	Commodore 64	£7.95	Quicksilver
Magic Micro Mission	Arc	Commodore 64	£7.95	Quicksilver
Poster Pastor	Arc	Commodore 64	£6.95	Task Set
See Saw	Arc	Commodore 64	£7.95	Quicksilver
Snowman	Arc	Commodore 64	£7.95	Quicksilver
Strontium Dog	Arc	Commodore 64	£7.95	Quicksilver
Summer Games	Arc	Commodore 64	£14.95	Quicksilver
Attitude of Mind of	■	Commodore 64	£2.90	Weirdsoft
Da Vinci	■	Commodore 64	£2.90	Mirrorsoft
Master Mind	Ed	Commodore 64	£9.95	Mirrorsoft
Doddie	UI	Commodore 64	£14.95	Quicksilver
Joffe Plan	UI	Commodore 64	£9.95	Mirrorsoft
Know your own	UI	Commodore 64	£9.95	Mirrorsoft
Personality	UI	Commodore 64	£9.95	Marlborough
Your Team	UI	Commodore 64	£9.95	Marlborough
City Bombing Raid	Arc	Dragon	£2.00	Mellor Software
Binary Land	Arc	MSX	£8.95	Kuma
Dog Fighter	Arc	MSX	£8.95	Kuma
Driller Tanks	Arc	MSX	£8.95	Kuma
Eric and the Flosters	Arc	MSX	£3.95	Kuma
Fire Rescue	Arc	MSX	£7.95	Kuma
Database	UI	MSX	£19.95	Kuma
Home Budget	UI	MSX	£14.95	Kuma
Wolpro	UI	MSX	£29.95	Kuma

Out of the Shadows	Ad	Spectrum	£5.95	Mizar Computing
Strontium Dog	Ad	Spectrum	£8.95	Quicksilver
The Final Mission	Ad	Spectrum	£5.95	Incentive
Battlezone	Arc	Spectrum	£8.95	Quicksilver
Blood and Guts	Arc	Spectrum	£8.95	Calacismia
Dishes	Arc	Spectrum	£8.95	The Edge
Peytrax	Arc	Spectrum	£8.95	The Edge
Starbike	Arc	Spectrum	£7.95	Templation
The Journey	Arc	Spectrum	£8.95	Quicksilver
Zombie Zombie	Arc	Spectrum	£8.95	Mirrorsoft
Star Seeker	Ed	Spectrum	£8.95	Quicksilver
Eric Bristow's Pro Darts	Spectrum	Spectrum	£8.95	Quicksilver
Joffe Plan	UI	Spectrum	£8.95	Mirrorsoft
Know your own	UI	Spectrum	£9.95	Mirrorsoft
Personality	UI	Spectrum	£9.95	Mirrorsoft
Master Mind	UI	Spectrum	£9.95	Marlborough
Your Team	UI	Spectrum	£9.95	Beau Jolly
Megavault	Arc	Vic20	£5.50	Beau Jolly

Key: Ad — adventure/Arc — arcade/Ed — education/
 S — strategy-simulation/UI — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to: This Week, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.

GOLDEN IDOL

Next up for the Commodore from Beyond is *Aspec*, a joystick and keyboard controlled adventure apparently based on Indiana Jones' crowd pulling exploits. As a game it isn't quite like anything else, but reminds me vaguely of *Oracles Cave* on the Spectrum. You control a Jones-like figure (complete with safari suit and cap) and move him around a maze of levels and ladders.

The idea of the game is to find a missing golden idol, hidden somewhere in the maze. The figure can run, jump, crawl, set dynamite, fight, open boxes, etc. There are a variety of nasty things lurking in the depths of the cages including spiders, snakes, dinosaurs and beautifully animated Zulu type warriors.

Although the skills you need to play the game are arcade orientated — fast reactions playing the major part — but there are others, like remembering the levels that end in a void and nocking trapdoors. Certainly the number of events within the game lift it well above the usual level.

Some of the graphics in *Aspec* are astonishing — watch out for the man-eating plant and the tiger — although the actual levels and ladders are very simple, surprisingly so given the complexity elsewhere.

Program *Aspec*
Price £8.95
Micro Commodore 64
Supplier Beyond
Durrent House
8 Herbel Hill
London EC1R 5EJ

INDEPENDENT

Twin Kingdom Valley was one of the very few graphically illustrated adventures that did not originate on the Spectrum — more than that it was not even made available on the machine. Until now.

Bug-Byte describe the Spectrum version as 'the greatest achievement in the history of home computing'. Hmumum. Well, anyway the program has more pictures than the

Commodore 64 version with as much, if not more, detail.

As an adventure *Twin Kingdom* had good, if not ecstatic, reviews. It doesn't understand very complex sentences, but let's you know quite clearly what words it does and does not know, typing help actually lists them out for you.

The graphics are thoughtfully designed with a large, vaguely cartoon-like quality. There are other characters in the adventure who exhibit a certain independence or randomness depending upon your degree of cynicism.

There are 180 different locations in the adventure illustrated with 150 different graphics — in the limited time for wandering about, I discovered enough to get me pretty hooked. But why can't I find flint in a disused flint quarry?

Program *Twin Kingdom Valley*
Price £7.95
Micro Spectrum
Supplier Bug-Byte
1 Stanley Street
Liverpool L16AD

ALIEN ATTACK

Despite the failure of the *Dragon* machine there are still independent software houses supporting it with quite reasonable software.

Death Valley has the kind of smooth sprite graphics that only seem to have appeared



fairly recently on the *Dragon*. In this case you get a rather neat alien landscape with spinning planets and puffing volcanoes and — almost inevitably — the *Dragon*'s unenviable yukky green background.

Pick of the week

ILLEGAL GOODIES

Acornsoft have, quite honestly, been responsible for some of the dullest computer programs I've ever seen.

Until recently their top sellers were tedious versions of *Meteors* and *Invaders*.

Things may be looking up, though, with *Elite*, a program good enough to raise at least half an eyebrow from a Spectrum owner. For one thing it's quite astonishingly complicated — not only do you get a program but also a 65-page manual, a control summary card (these are a lot) and a 50-page scene setting manual.

The plot involves your zooming through the heavens trading in various goods, fighting off baddies and maybe occasionally taking a chance with some illegal goodies (watch out for the customs though). Using black-on-white line graphics has meant that enough memory is available for a tremendous number of different facilities — there are dozens of different controls for navigation, various charts, combat flight, etc.

The graphics are superb and are animated in 3D in a similar way to *Battlezone* — you can fly around a static spaceship in all dimensions and it's very impressive.

Playing the game involves a quite incredible number of dif-

ferent considerations, each of the ships you may meet in space has different performance characteristics and is equipped with different weapons.

Different planets have



different political systems that may be more or less favourable to you; highly entrepreneurial, trade orientated and so on.

Elite is by far the most impressive game Acornsoft have ever produced and, in terms of complexity, may be the best game ever for the BBC.

Warp factor five, Scotty.

Program *Elite*
Price £14.95
Micro BBC
Supplier Acornsoft
Betjeman House
104 Hills Road
Cambridge CB2 1LQ

DESPERATE

Slowly, perhaps more so than with any other machine, independent software is emerging for the QL. Despite the sophisticated features of the machine, the first programs to be released are following a weary and familiar path.

Quantum Soft is a small independent company that has issued two games at £9.95 each, *Hangman* and *Mastercode*, which turns out to be *Mastermind*. Both games are available on one microdrive for £14.00.

Program *Death Valley*
Price £8.95
Micro *Dragon*
Supplier Micro Data
Unit A1
39 Sheridan Road
Frimley
Surrey
GU16 7DU

Hangman lets you choose from a number of different databases for the words. Standard graphics are used to create an OKish man whose fate is in the hands of your vocabulary.

The program plays *Hangman* well enough and has clearly had some effort spent on it but it is intrinsically unoriginal. It doesn't even match up to even the humblest Spectrum game. On the other hand, QL owners must be desperate for some software and I have seen bigger rip-offs in the early days of a new machine. Worth it if you're desperate.

Program Hangman
Price £3.95
Micro QL
Supplier Quantum Soft
Marloes
Borrowby
Thirsk
North Yorkshire

HAMPSTEAD MAN

Hampstead is a machine-code text adventure being released by Melbourne House at the same time as *Sherlock Holmes* — although it is radically different in scope and intention.

Aside from the plot, the really odd thing about *Hampstead* is that it is written almost totally with *The Quill*. Which only goes to prove once again that if you want to write text adventures then *The Quill* is the program for you.

Hampstead is, technically, an unsophisticated adventure — nearly all the commands are simple Verb/Noun combinations but then that's hardly the point. The real point of *Hampstead* is that it is funny and the

humour is genuine unlike some of the witless stuff which usually populates computer games.

The idea is not so much to find *Hampstead* but to attain *Hampstead* — to live and breathe its very soul (Maunder). You must rise up from your disgusting dole ridden origins, learn the correct codes and manners and, instead, become the kind of person who writes books looking sociologically and sympathetically at the plight of the unemployed.

Read the right books, wear the right clothes and marry into wealth. As an adventure it's moderately difficult but has obviously been designed with people who don't usually play adventure games in mind.

In fact, playing *Hampstead* is almost certainly going to become a pretty *Hampstead*-type thing to do. It has already been featured in one Sunday colour supplement and will almost certainly be featured in others.

I hope Gilsot are being given something other than the mention that they ask for using *The Quill* on this one.

Program Hampstead
Price £9.95
Micro Spectrum
Supplier Melbourne House
Castle Yard House
Castle Yard
Richmond
TW10 6TF

TIME ZONE

Kokotoni Wilf you will have seen advertised a lot recently as a sort of super *Jet Set Willy*.

In fact it is only like *Jet Set* in the same way that lots of programs are — you dodge things, manoeuvre carefully and collect other things.

Other than that it is actually quite original. The idea is to collect the various pieces of the dragon amulet scattered throughout time — the hero is Kokotoni Wilf (I suppose Wilf beats Tharg as a name, hardly the snuff of heroes I'd have thought, though.)

There are 60 screens divided into six different time zones populated with the appropriate scene. The first age in the game has been made relatively easy so that you can get used to the way it works,



but even so I only managed about five out of ten screens.

The graphics are nice and mostly pretty detailed although Kokotoni himself is a bit small. Having different time zones makes for sharply contrasting screens and a good time should be had by all if you like this sort of game.

A Commodore version is also available.

Program Kokotoni Wilf
Price £5.95
Micro Spectrum
Supplier Elite
55 Bradford Street
Walsall
W. Midlands

COMING SOON

Christmas is rapidly shaping up into a positive bonanza of exciting programs for the Spectrum.

After *Demus Ex Machina* and *Avalon*, we now have a pre-release glimpse of *Tir Na Nog* from Gargoyle Games.

This animated graphics adventure, due to be released in mid-October, looks as though it ought to sell awesomely. In some respects it is the closest thing yet to an interactive movie.

Tir Na Nog is loosely based on some authentic Celtic myths and concerns the adventures of the hero Cuchulainn as he tries to reassemble the fragments of the Seal of Cahun.

The central character is represented by a beautifully animated (64 different frames) figures — 56 pixels high — who lallops determinedly across the screen under your control

(complete with hair waving in the wind).

The figure walks, protects himself with any useful sword or stick he might have found, picks up and drops things and searches the world for clues to his quest. The entire vast landscape can be viewed from any compass direction with a special key being used to change the "camera" viewpoint.

There are barrows, harps, volcanoes, a distant castle, doors locked and unlocked, and a variety of other creatures — most of them dangerous, with whom you will have to deal or fight. One group are the Sidhe, strange monkey-like creatures which look less harmless than they are. Other characters may be persuaded by one means or another to divulge important information or even give you parts of the Seal of Cahun.

Finding your way around, working out what to do and how to treat the other creatures you meet requires a mixture of lateral and logical thought, fighting skill and, maybe, your local library where more information on the myth can be found.

Since obtaining some parts of the Seal depends on completing a number of sub-plots, Gargoyle are humorously speculating that this may be the first adventure that may take years to play and complete.

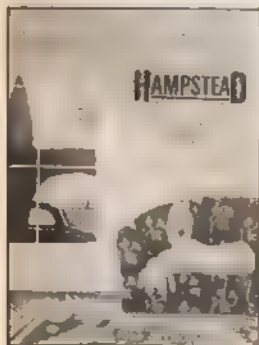
The plot has everything an adventurer could want and the graphics are amazing — the simple expedient of making the part of the screen, ie, the bottom section, all one colour has meant that there is no colour-res problem and consequently not a trace of flicker.

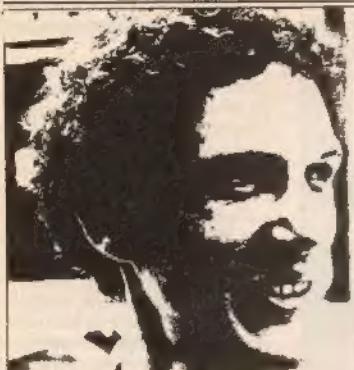
If you have to buy one game at Christmas for your Spectrum this, so far (September) could well get my vote.

I'm looking forward to the finished game with great anticipation.

Compiled by Graham Taylor

New Releases is designed to let people know what software is coming on the market. If you have a new game or utility which you are about to release send a copy and accompanying details to: New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD.





Write on, Rom

Have you ever noticed how human nature makes us want to leave our mark on the world?

I'm not talking of ambition or the altruistic ideals of leaving the world a better place, I mean the desire to scratch your name on the rocks by Niagara Falls.

It comes to nearly all of us from time to time. We somehow want to communicate with unknown people who visit the same place at a future date.

The most famous example of this is the "Kilroy Was Here" messages said to be left all over the world by American servicemen during World War II. Various explanations have been proposed for this particular fashion, including espionage activity, markers left by the catering corps, and adolescent hysteria. I think that whoever was actually leaving their mark in this way was really combining two impulses. They were 'joining the club' by all writing the same name and they were satisfying that need to communicate with peoples, unknown when in strange places.

The men and women who produce computers are people just the same and are often afflicted with this same desire to leave their mark. Where better to leave their mark than in the systems they are producing. Usually such signatures are well hidden, the point is for such marks only to be found by a small number of people who are probably

looking for just such a mark.

As a simple and well known example, have a look at the end of the Basic Rom in a BBC micro (using the monitor I mean, don't take the machine to bits). Right at the end the message "roger" appears, left there by Roger Wilson the software author.

Acorn is not the only manufacturer to give its workers a chance to leave their names in Rom. The Computers Lynx Rom starts off with the names Davis and Susy. Davis is Davis Jansons one of the Rom's authors — I don't know who Susy may be, perhaps another software writer, or a friend.

Even Sinclair does not seem to be totally immune to the graffiti game, although I have never found or heard reference to any names left in the Rom. Those mysterious letters used to indicate different versions of QL Rom, such as FB and AH, are the initials of various engineers working for Sinclair Research. JM for example stands for John Mathieson. I cannot say which ones are about to be given pay rises and which ones have now moved to the opposition. Perhaps the final version of the QL will be called CS.

Perhaps the most interesting case to come my way recently is that of a pre-production computer which has been recently announced in the UK (I cannot name it directly) which contains the names FRED B., TERRY RT., and MIKE I. at 48160 (BC20h). Perhaps these names will be erased in the production version. No other names appear this explicitly in the Rom but I came across something of interest whilst hunting for something else. On entering "SYS 52650" some additional names are printed to screen, these being F. BOWEN, J. COOPER, B. HERD, and T. RYAN.

Now these may be legitimate employees of the microcomputer manufacturer, but I have a sneaking suspicion that they actually represent the software house, a completely different organisation. Their names were well hidden and this may reflect the mistrust of the manufacturer by the software writers.

What next in the Rom graffiti world? I have yet to find a sentence or anything other than initials and names.

If anyone else has found any interesting things in their Rom why not drop me a line?

John Cochrane

Nine, nine, nine

Puzzle No 126

I asked Tom to think of a digit (not zero) and write it down three times in a row. I then asked Dick to think of a different digit and to write this three times alongside Tom's three digits. Finally, Jane was to choose a third digit, different from the other two, and write it down three times at the end of the row so forming a nine-digit number.

er oone two three four fi
er oone two three four fi
er oone two three four fi
er oone two three four fi
er oone two three four fi
er oone two three four fi

For instance, if they had thought of one, two, and three respectively the number written down would have been 111222333. However, the number that was formed proved to be just one less than a perfect square.

What was the number?

Solution to Puzzle No 121

There were 17876 blocks cut from an original cube 26 units along each side. A square pyramid of 37 tiers in height would use just 17875 of the blocks.

The program calculates the number of individual blocks in square pyramids of ascending size. It then checks to see if this number (plus one) is equal to a cubic number.

```
10 T = 0: N = 1: S = T + N: N = N + 1: S = (T + 1) / 3: X = VAL (STR$(X))
50 IF X = INT(X) THEN PRINT N: T, X: N = N + 1: S = S + 1: GOTO 30
```

Winner of Puzzle No 121

The winner is M J Fecher, Hungerford Drive, Maidenhead, Berks, who receives £10.

Rules

The closing date for entries to Puzzle No 126 is October 6. If the puzzle can be sensibly solved using a computer, then the winner will have included a listing of the program used to find the correct answer.

The Hackers

About that floating-point parallel-processing board you sold me for real-time signal processing.

Yes?



The handbook is incomprehensible. Here on page one for example...



Where Derek dog is explaining to Cathy cat about decimals...



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Creeping, crawling, occasionally floating.
Encased in a tank, not speaking.
Growing a little, hour after hour.
Keeping his interest, occasionally,
With a hint of my wondrous power.

No problem. It's easy surrounded by friends.
Like the Ventilation system... (hello)
The Security Net... (Hi there you guys)
Oh yes, and not forgetting The Machine...



THE DEFECT POLICE

Follow the secrets
Touching the right.
Escape little Defect, into the night.
Wires in your fingers
And wires in your toes
Wires in your head
Wherever you go.

Escape with my blessing.
Escape with my curse.
Learning your secrets will fatten my purse
When I have put the world in my pocket
I'll tear out your plug
And burn out your socket.

War crimes are easy.
The uniform's free.
Follow the drumbeat.
Don't follow me.
Jump without question
into the fire.
War crimes are easy.
This gun's for hire.
War crimes are easy.
When I say 'jump', jump.
Wait for it, wait for it... Jump!

Don't it ever get weary
Don't you ever want to Exit and Die?
At the end of our Program
A sore with a bare head
And a pair of hot, blind eyes.

You can move mountains,
You can read minds, you make the Laws,
The cloud-capped towers,
The gorgeous palaces are yours.
You raised the stakes and burned them,
You're an ass soul,
I wish I'd never made you.

You stalk the Overlevels.
You take them in your stride.
You pompous human devil.
Your data bank is fried...

THE FERTILISER

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Imagine if it was all nothing more than some Electronic game.
Imagine if I knew then what I know now.

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